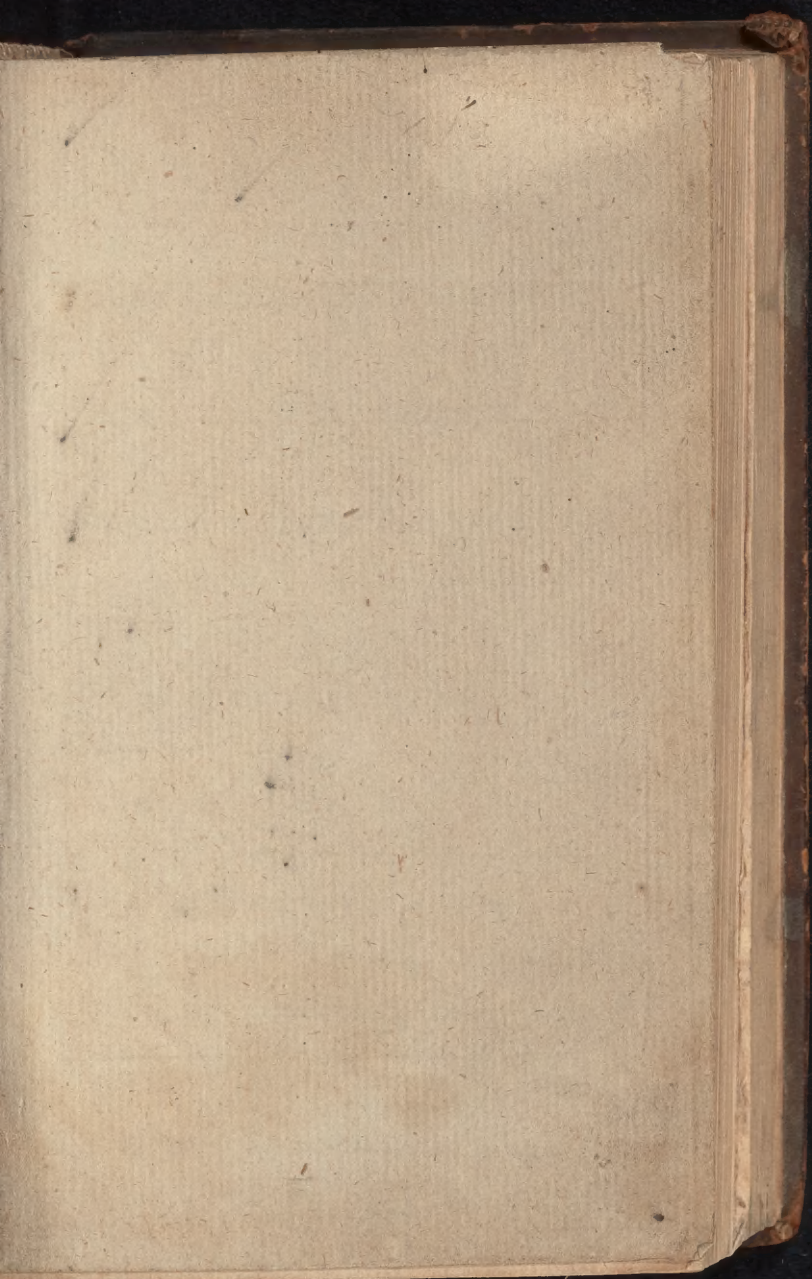


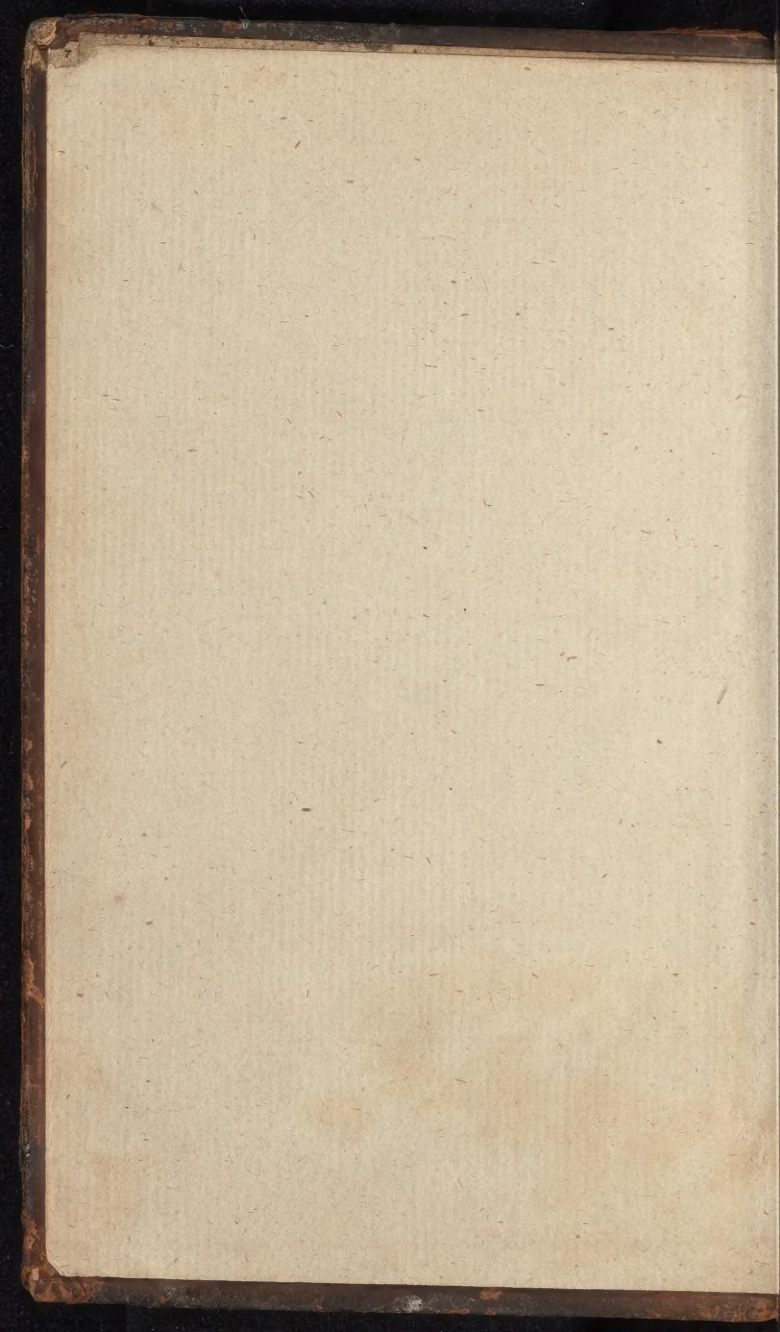
Ladies Instructor

1778



Arthur William English.





MENTORIA:
OR, THE
YOUNG LADIES INSTRUCTOR,
IN
FAMILIAR CONVERSATIONS
ON
MORAL AND ENTERTAINING SUBJECTS:

CALCULATED to improve YOUNG MINDS,
In the ESSENTIAL, as well as ORNAMENTAL
PARTS of FEMALE EDUCATION.

By Miss ANN MURRY.

DEDICATED, by PERMISSION, to
THE PRINCESS ROYAL.

L O N D O N :

Printed by J. FRY and Co.
For EDWARD and CHARLES DILLY,
in the Poultry.

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ADVERTISEMENT.

THE following Dialogues were presented in manuscript to the Princess Royal; in consequence of the approbation they met with, the Author obtained the honor, and gracious permission, of dedicating her performance to her Royal Highness.

ADVERTISEMENT

THE following Descriptions were
presented in manuscript to the Ex-
cellencies in Council, on the 10th of the
present month, and were
not only read, but also
discussed, of which the
performance is here
given.

TO HER ROYAL HIGHNESS.

THE PRINCESS ROYAL.

May it please your Royal Highness,

GRACIOUSLY to accept my first literary production ; which was professedly written for the instruction and amusement of young minds ; if it produces that effect, and gains your Royal Highness's Approbation, I shall obtain the ulti-

mate end of my wishes. I disclaim the usual stile of Dedication; as being incompatible with the Sincerity I profess, and practise. Flattery, like Poison, is certain in its operations, and destructive in its consequences; various are the means of infusing this mental evil, but those never fail of obtaining success, which are ministered in the pleasing semblance of deserved applause. Deign to receive my ardent prayers, that your Royal Highness may attain every possible degree of perfection! and that you may be
good,

good, as well as great; great by Royal descent, but superior by exemplary Virtue! Let me earnestly entreat your Royal Highness, not to disappoint the hopes of an expecting nation, who seek in your Royal Highness, a continuation of those amiable qualities, which so eminently distinguish our most gracious Queen: strive like her to gain universal approbation; make her the model of your conduct; and may God grant you grace, so closely to copy the bright original, that two such animating pictures
may

may influence the manners of posterity, and enhance the merit of Female Virtue!

I am, with profound respect,

Your Royal Highness's

Most Obedient and Faithful Servant,

ANN MURRY.

Tottenham High-Crofs,

April 8, 1778.

P R E F A C E.

THE Author of the following Dialogues, in conformity to custom, deems it necessary to allege some reason, or offer some excuse, for presenting them to the public. She is conscious of their defects, and therefore trusts that the plan, rather than the execution, will insure their success. She begs leave to plead in their behalf, they were originally written for the use of her pupils; the advantages they derived from them, and the favourable

able reception they met with in the circle of her friends, were the chief motives of the present publication. If, by checking the rapid progress of folly and dissipation, they advance the cause of knowledge and virtue, she will think her labours amply rewarded.

She is aware justice may urge the critic, to pass a severe sentence on her performance, but as whatever faults may be in it, she sincerely wishes to amend, so she can assure him, that vanity bore no share in her undertaking so arduous a task. It was perhaps above her years and abilities;

abilities; yet, as it seemed particularly suited to the nature of her employ, she was tempted to combat the difficulties which attended it.

Dialogue and fable, are in general esteemed the best vehicles to convey instruction, as they lure the mind into knowledge, and imperceptibly conduct it to the goal of wisdom. This mode of practice often succeeds, where formal precept fails, and might produce an happy effect, if it were more frequently adopted. The younger part of her readers, are earnestly entreated to pay attention to the lessons contained

tained in the following pages, which she hopes, like a nosegay composed of different flowers, will dispense their fragrance, and prove an agreeable compound!

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- p. 100, l. 21, *for* is also, *read* it also.
p. 109, l. 15, *for* he Pagans, *read* the Pagans.
p. 112, at the end of l. 12, *add* to.
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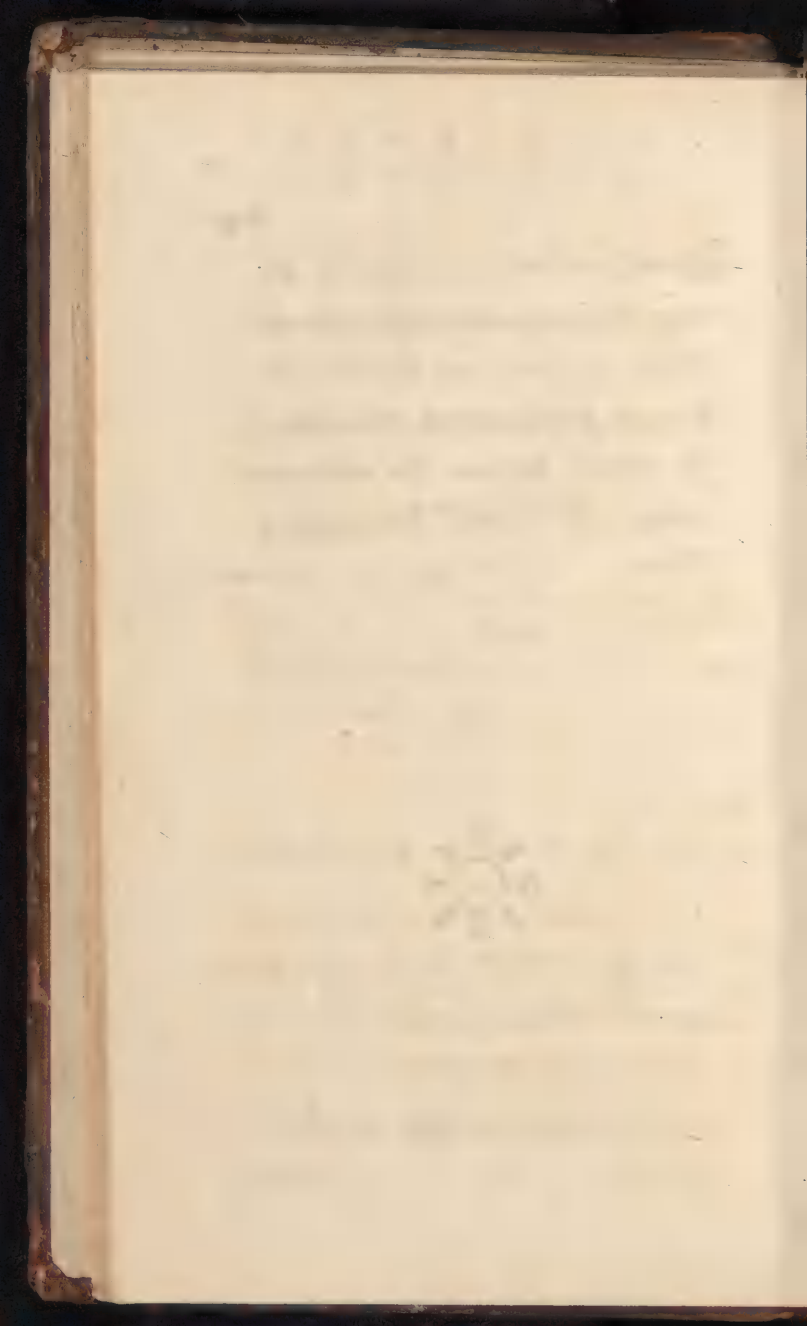
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especially considered in the degrees of Parents, Children, Brothers, Sisters, Friends, Masters, Servants; and universal Philanthropy strictly enjoined, as the basis of the Christian Religion. The whole concluding with a general Exhortation to Virtue.

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DIALOGUE I.

MONDAY.

On Industry, Truth, and Sincerity.

Mentoria.

AS your and your sister's improvement, my dear Lady Mary, engrosses my whole attention, I propose employing the remainder of the morning in pointing out those measures I think will be most conducive to it. I am not so rigid as to exclude amusement from the system which I mean to form; though I wish but a small portion of your time to be spent in trifling pursuits. There is scarcely any thing of more importance, and what is more extraordinary, less attended to, than habitual Industry. So clearly am I convinced of the advantages which arise from the practice of this virtue, that in the prosecution of my present plan, I intend to allow some employ for every hour in the day, and shall endeavour to blend in-

B

struction

struction with amusement, as they do not appear to me the least incompatible, though from the prejudice of weak minds, they are usually considered so. The thoughtless and inconsiderate receive instruction like a medicine, and nauseate the draught; but partake of the banquet of amusement, with as much ease and pleasure as if it were their daily food. If we were to examine these different qualities with minute attention, we should find they often differ only in the name. Many pursuits where pleasure is the end proposed, produce disgust and pain; whilst on the contrary, those avocations which seem attended with difficulty, reward the labour of such who surmount them, with knowledge and glory!

Lady Mary.

My dear Mentoria, are we always to be reading, working, or writing, and never play?

Mentoria.

Certainly not, my dear: my present object is to diversify your pursuits; and to regulate them in such a manner, that, whilst you are seeking improvement, you may be amused. The judicious choice and disposition of the agreeable and useful qualifications of the mind, produce the same effect in a human character as the contrast of light and shade, does in a fine picture,

picture, which constitutes the beauty and intrinsic value of both.

Lady Louisa.

I think we are always employed. How much time we spend in getting our lessons! I often lament I have not more time to play.

Mentoria.

I agree with you, Lady Louisa, in thinking you spend a great deal of your time in getting your lesson: I am sorry to add, as my opinion, often more than is necessary for the purpose. The habitual Industry I mean to inculcate, will, I hope, obviate this objection, and give me no farther cause of complaint. When you seriously reflect, that, if you do not perform your business in the space of time appropriated to that purpose, it will interfere with your attendance on your Masters, or some other branch of your duty, you will be inclined to pursue your studies with the attention they deserve. The advantage would evidently be your own, as by that means, you would have part of your time entirely at your own disposal.

Lady Mary.

What alteration then, my good Mentoria, do you mean to propose in our education?

Mentoria.

None that will affect your Ladyship's peace.

I shall expect never to see you idle: and shall be displeased, if you tell me you have nothing to do; always endeavour to suit your employ to the circumstances of your situation. I would advise, when you are engaged with your friends, to let your pursuit be of a nature that does not require close application; as I think a mark of ill breeding, to bestow great attention on any object, which does not immediately conduce to their amusement.

Lady Louisa.

I suppose, as you are so fond of reading, you will expect it to employ great part of our time.

Mentoria.

You are mistaken, my dear, I am no friend to persons of your age spending much time in reading, except to those who are capable, and willing, to correct their errors. For though by Industry, you may comprehend the meaning of words, you can never attain the just pronunciation, but by the instruction of an intelligent mind.

Lady Mary.

I cannot yet discover, my dear Mentoria, in what you mean to differ from our usual mode of practice: Are we to be detained longer with you in the morning?

Mentoria.

Mentoria.

It is not my intention to keep you one moment longer than the usual time. It is not the number of hours, but the use you make of them, which will secure your improvement. The mental, as well as the corporeal faculties, derive the most advantage from the sustenance which is administered in small quantities; the lighter the quality, the easier it is digested, and more conducive to the support and nourishment of the whole system.

Lady Louisa.

What are the peculiar advantages of Industry, my good Mentoria?

Mentoria.

They are of such general utility, it is impossible to enumerate them: those who are distinguished by any extraordinary qualities, are commonly indebted to this virtue for the superior excellence they have attained. Many useful discoveries are produced by chance, which could never be brought to perfection without the aid of Industry. I cannot produce a stronger instance to prove the efficacy of Industry, than the advantages Demosthenes derived from this virtue. His example ought to teach us, few difficulties are insurmountable, for by nature he was not designed

for an Orator, as his voice was weak and inharmonious, and his manner ungraceful. With these defects, it is wonderful, he applied himself to the study of eloquence; as of all others it seemed the least suited to his abilities. In order to remove the stammering articulation of his words, he used to declaim on different subjects with pebbles in his mouth, when he was ascending steep places, which strengthened his powers of respiration. To accustom himself to the noise of the Courts of Justice, he frequently made orations by the sea-side, when the waves were most tempestuous. He was no less attentive to his action, and general deportment; as he was conscious he had contracted a bad habit of shrugging up his shoulders, he caused a pulpit to be erected on such a particular construction, with an halberd hanging over it, in which he used to practise his declamations, that whenever the vehemence of his action prompted him to exceed the proper bounds, the halberd proved an useful monitor. His wisdom suggested to him the necessity of close application, he therefore had a study built under ground, where he used to seclude himself from the world, and often not appear for two or three months. Whilst he

was

was in this retirement, he shaved but one side of his head, that he might not be tempted to appear in public.

Lady Louisa.

I am astonished he had such resolution; I dare say his friends used to laugh at him.

Mentoria.

The discouragement, my dear, he met with, enhances the merit of his perseverance; for notwithstanding, on his first appearance he was received with universal disapprobation, and even silenced by the hisses of the populace, so far from discontinuing his pursuit, he redoubled his assiduity, and at last became one of the most eloquent men of the age.

Lady Louisa.

Do you think, my dear Madam, if I were to try and take great pains, I should sing as well as Signora Sessini?

Mentoria.

Try the experiment; always point out those as a model who excel; by which means you will acquire a tolerable degree of proficiency in the art you admire; though you may not be able to attain the same degree of excellence.

Lady Mary.

I am surprised more persons do not follow the good example of Demosthenes.

Mentoria.

Mentoria.

Few persons, my dear, are conscious of their own defects. It is necessary to be sensible of the weakness of our state, before we can endeavour to fortify it. Those, whose imperfections are so glaring, cannot be ignorant of them, they turn their eyes from the dark side of the picture, and solace themselves, that they possess some useful, or agreeable quality, which serves as a counterpoise for those in which they are defective. There is another reason which may be alleged, why so few endeavour industriously to excel; namely, the repugnance of human nature, to pursue any plan, to which it has not a natural propensity. There are scarcely any, who have resolution to act directly contrary to their inclination; and they urge in their defence, that the bent of the genius ought to be considered. To such persons I would reply, the initiation into all sciences and languages is tedious, and in some degree laborious: perseverance will enable us to gain the summit, which at our first view seem'd inaccessible. When we have attained thus far, we shall find the descent easy, and the path strewn with flowers, by the side of refreshing streams.

I recollect a few lines I wrote the other day
on

on Industry, which I will now repeat, as they are applicable to my present purpose.

Th' industrious bee extracts from ev'ry flow'r
 It's fragrant sweets, and mild balsamic pow'r.
 Learn thence, with greatest care, and nicest skill,
 To take the good, and to reject the ill.
 By her example taught, enrich thy mind,
 Improve kind nature's gifts, by sense refin'd;
 Be thou the honey-comb in whom may dwell
 Each mental sweet, nor leave one vacant cell.

Lady Louisa.

I hope, my dear Mentoria, I shall practise the excellent lesson, contained in those lines. What virtue do you esteem and recommend, next to Industry?

Mentoria.

I purpose now, my dear, to subjoin a few observations on those, which ought to be the leading principle of your actions; I mean Truth and Sincerity, which, in many instances, are synonymous terms.

Lady Mary.

My good Mentoria, pray, what are synonymous terms?

Mentoria.

Words, which have a different sound, yet

bear the same signification; such as *pusillanimity*, and *cowardice*, with many others too tedious to mention.

Lady Mary.

What resemblance is there between truth, and sincerity?

Mentoria.

Truth is the mother of sincerity, who possesses all the amiable qualities of her excellent parent, and yields implicit obedience to her laws.

Lady Louisa.

If I could not possess both these virtues, which ought I to chuse?

Mentoria.

They are bound by such strong ties, it is impossible to disunite them; as wherever truth fixes her residence, sincerity is always found, her constant attendant.

Lady Mary.

I have always been taught the necessity of speaking truth; and hope never to err from it.

Mentoria.

I would earnestly advise you, not only to avoid being guilty of advancing an absolute falsehood, but also to guard against the slightest deviation from truth. In every system of laws, are specified different degrees of
trespasses

trespases, and punishments annexed, proportionate to the offence committed. Thus, many persons, who would shudder at the thought of being guilty of any violent assault on the lives or properties of their fellow-creatures, make no scruple to injure them in a point, which more essentially affects their happiness. In like manner, many, who would be shocked with the idea of openly violating the laws of truth, by telling a direct lye, make a constant practice of extenuating some circumstances, and exaggerating others, as best suits their purpose. It is to this conduct, we are indebted for the mis-construction of most actions; the concealment of some favourable incident often produces the same consequences, as the most full and elaborate confession of guilt. From which it evidently appears, we are bound by the strongest ties, to express every thing as it really is; neither to varnish a bad action with the weak excuse that it is a general practice, and, as such, ought to be considered less atrocious: neither should our zeal in any cause, ever induce us to temporize, and give evidence against our judgment.

Lady Louisa.

I suppose, my dear Mentoria, you would be

B 6

extremely

extremely displeased, if you discovered in me an untruth.

Mentoria.

It would give me infinite concern, my dear, as I should fear, it would give your friends an unfavourable opinion of you, and, in some degree, cast a stigma on your future reputation. The path of truth is so wide and straight, I am surprized, any persons should prefer the labyrinth of falsehood and deceit; as its windings are so intricate, that few find their way out, though they have recourse to every artifice, to effect their escape.

Lady Mary.

It would mortify me exceedingly to have the truth of what I advanced disputed.

Mentoria.

You are perfectly right, my good Lady Mary; there cannot possibly be a more humiliating circumstance. I would wish your reputation for veracity to be so firmly established, that your bare testimony would carry as strong convictions, as the most solemn protestations. In order to avoid your honour being called in question, deal as little as possible in the marvellous; nor ever affirm the truth of an improbable circumstance, without you saw the transaction, and are convinced of its reality.

There

There is another species of falsehood I shall particularly guard you against, as it courts us under a pleasing form, and consequently blinds our judgment: I mean the bad habit of repeating things as jokes, which have no foundation in truth; and also a supposition, that a falsity can be innocent, if it does not prejudice another. Those who indulge themselves in this practice, soon exceed the bounds which even their own imagination can allow to be innocent; as there are very few so depraved, as to plunge at once into the depth of vice, but proceed from a slight deviation from virtue, to an open violation and contempt of her laws.

Lady Mary.

I am certain, my dear Madam, what you have said, will prevent my ever telling stories.

Mentoria.

I shall now proceed to point out the advantages, which arise from Sincerity. The practice of truth naturally produces this virtue; as those, who accustom themselves to make no promises, but what they intend to perform, or not undertake what they think they cannot execute, never fail of possessing this amiable quality, which stamps a value, and diffuses a sweetness, over all their actions.

Lady

Lady *Louisa*.

How are we to know, when people are sincere?

Mentoria.

We are indispensibly bound to consider every body in that light, till they have given us just cause to be of a contrary opinion. It is more consistent with true charity, to deem a person innocent, till there is full and clear conviction of his guilt. It would render our intercourse with society painful, if we were to suspect the professions of our friends, and put an ill construction upon their kind offices. Common prudence forbids our thinking, that every person, who treats us with civility and attention, is deeply interested in our welfare. Neither are we to take the flattering compliments of our acquaintance in a literal sense, as they too often are not the real sentiments of their hearts.

Lady *Mary*.

Do not persons, who are sincere, always keep their word, and are they not constant in friendship?

Mentoria.

Else they could not be esteemed sincere. It is necessary to inform your Ladyship, there are two kinds of promises; the one absolute,
the

the other conditional. The former ought to be performed, though to our own prejudice or inconvenience; the latter, from intervening circumstances, may be postponed, and even annihilated. Respecting constancy in friendship, there requires little to be said, to evince the necessity of our being steady in our attachments, and faithful in our engagements. We should be cautious in the choice of our friends, and ever choose to associate with those, who possess valuable, rather than shining qualities.

Lady Louisa.

I suppose, we should never forsake our friends, whatever changes happen to take place in their situation.

Mentoria.

No alteration in their outward condition ought to lessen your affection for them. On the contrary, if they labour under any affliction, or have felt any shock in their fortune, you should industriously seek every opportunity to convince them, they are not of less consequence in your esteem. You ought also to be more observant in paying them every mark of attention, than when they were your equals; lest they ascribe your negligence to pride, and consider it as an insult offered to their situation.

Lady

Lady Mary.

If any of my friends, my dear Mentoria, were to act inconsistent with prudence, would it be blameable to forsake them?

Mentoria.

The bonds of friendship, under particular circumstances, may be broken, notwithstanding it is a serious and solemn engagement. For instance, if a young lady of your acquaintance was a notorious story-teller, or disobedient to her parents, I should not only think it a pardonable, but a justifiable measure, to strike her from the list of your friends; as you are no farther obliged to associate with a dangerous companion, than you would be required to visit her, if she were infected by the plague. As in both cases, most probably the contagion would spread, the latter, would only endanger your constitution; whilst the former, prejudices what is infinitely of more importance, the reputation!

Lady Louisa.

Are there any other duties, belonging to Sincerity?

Mentoria.

The keeping of secrets, is a branch of Sincerity, on which it is necessary for me to make a few observations. You ought never to
betray

betray the trust reposed in you, or divulge any circumstances, your friend wishes to conceal; as nothing can render a person more contemptible, than breach of confidence.

Lady Mary.

I suppose, there would be no harm, if I told you only, the secrets, I was intrusted with.

Mentoria.

Your Ladyship will scarcely believe, notwithstanding you mean to pay me a compliment, that I should be extremely disgusted with you; and be apt to imagine, you would divulge my concerns to your young acquaintance. Whatever injunctions you lay me under not to speak of the anecdotes you had revealed, if I chose to break through them, you could not with justice upbraid me as you had been guilty of the same offence. I beg you will avoid reserve and duplicity, in your conduct. If your actions are regulated by the rules herein prescribed, concealment will be unnecessary. Vanity, and self-importance, induce many persons to be treacherous, with no other view, than to increase their consequence: by which means, they counteract their own purpose, in convincing us, they were unworthy the trust reposed in them; and ought to be shunned as traitors.

Lady

Lady Mary.

I fancy, my good Mentoria, you are no friend to secrets.

Mentoria.

No person can be less mysterious in their own concerns, than I am; though none can retain a secret more inviolably. If I think it prudent and for the advantage of my friends, to conceal any circumstances or event of their lives, I do not require to be bound by promises, or any other ties; but am guided by the Christian principle, of "doing to others, as I would they should do unto me."

Lady Louisa.

I hope, my dear Lady Mary, we shall both be exactly what good Mentoria wishes. How rejoiced she will be, to see us distinguished by the amiable qualities of Truth, Sincerity, and Industry.

Mentoria.

Blend them with the three Christian virtues, Faith, Hope, and Charity; and on such a basis, you cannot fail to raise a fair temple, which you are indispensibly bound to dedicate to virtue.

Obey her dictates, at her altar bend;

Convinc'd she is thy true, and surest friend.

Whene'er

Whene'er in error's maze thou chance to stray,
Her voice recalls, and clears the doubtful way.
Directed thus by her unerring laws,
Trace all thy blessings to their First Great Cause!
The great Creator wisely does dispense,
To all his creatures, diff'rent kinds of sense:
To some he ministers the gifts to please,
And pass thro' life, with unaffected ease;
On others, kindly pours a depth profound,
The darkest myst'ries clearly to expound.
Yet all are equal objects of his care,
Each individual the undoubted heir
Of future bliss, prepar'd with mighty love,
For all the righteous, in the realms above!



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DIALOGUE II.

TUESDAY.

On Orthography, and the Practical
Use of Grammar.

Mentoria.

MY dear Ladies, as you have gone through your different exercises entirely to my satisfaction; I shall now lay down some rules to accelerate your progress in English Grammar. As you have in the course of your lessons acquired the knowledge of Nouns, Pronouns, Adverbs, and Participles, it will be my present endeavour, to reduce them to a practical system. It is needless, to inform your Ladyships, that those who are defective in Orthography, though in an exalted station of life, are never ranked in the class of what is usually
filed

stiled good company. Their elevation renders their imperfections more conspicuous, and the reflection, that they have neglected to make a proper use of the opportunities granted them to improve their talents, subjects them to ridicule and contempt; whilst the poor, whose situation in life excludes them from every source of mental cultivation, excite our pity, and demand our assistance. As their ignorance cannot be imputed as a fault, the errors which are the natural consequence of it, should never be noticed, but from the humane motive of dispelling the darkness which obscures their understanding. This is a task of such a tender nature, it requires the hand of a skilful artist to perform the operation; lest, while we mean to heal, we wound.

Lady Mary.

I am much obliged to you, my dear Madam, for the pains you take to improve me, and Lady Louisa; and hope by our assiduity, to make you a suitable return. I am very desirous to speak and write correctly: The attention I pay to your instructions, I hope, will in a short time produce the desired effect.

Lady Louisa.

My good Mentoria, I have formed the same resolution; which, I hope, will make amends for my former negligence.

Mentoria.

Mentoria.

If, my dears, your future conduct will be consistent with your present declaration, I cannot doubt the advance of your improvement: your attainments will be the reward of my labours. Infancy like the Spring, is the time to sow the seed; which first blossoms, then comes to full maturity, and at last decays. I hope the soil of your understanding is so fertile, and the culture so well attended to, the buds of Knowledge will expand before the usual time, and be prematurely ripe.

Lady Mary.

How rejoiced, my dear Mentoria, you will be, to see us more accomplished, than young ladies of our age usually are.

Mentoria.

I should be exceedingly mortified, to find you defective in any branch of your education. I think, at present there seems no probability of my suffering any inconvenience on that account. I will now pursue my scheme, and endeavour to make some observations on the use of Grammar; which, I hope, will be of future service to you. I shall begin, by supposing you in company with a little girl about your own age; who would perhaps say, "Pray, Lady Mary, when was you at the play?"
When

When my Aunt and I *was* there, it was vastly full of company. Sir George and Lady Simple *desires* their compliments to you, and *hopes* you are well, and *wishes* to know how *them* pretty flowers of yours *goes* on." I hear you reply, "My Governess, Miss Simple, teaches me, when I speak in or of the Plural, always to say *were* instead of *was*: or if I address my discourse in the singular number, to make use of the words, *desires*, *sends*, *hopes*, *enquires*, *wishes*, &c. And when I speak of persons, she directs me to say, *they*, *those*, *them*, *who*, *whom*; but when I mention inanimate things, always to substitute the word *which* for *whom*. Examples. To *whom* do you speak? Or *who* told you so? Are *those* things yours? *Which* of these apples do you choose?"

Lady Louisa.

I clearly comprehend these examples; but wish to know the distinction of *these*, and *those*.

Mentoria.

I will readily comply with your request. The term *these* implies possession. Example. "*These* flowers in my hand:" and is often used to express the present time, as in this instance, In *these* days of refinement: whilst *those* is a word relative, or used in reference to some distant object; as *those* books on the table:
and

and is frequently used to denote a past transaction. Example.—“ In *those* early days, superstition prevailed.” I shall now proceed to explain the words, *hence*, *thence*, and *whence*, and their connection with *here*, *there*, and *where*. For instance, Whilst I am *here*, I will ride; but when I go from *hence*, I will walk. I intend to read the Spectators, when I am *there*; but when I go from *thence*, I propose to embroider a fire-screen. From *whence* did you bring this? Which implies, *Where* did you meet with it? Take this bird to the nest, from *whence* it came: which signifies, *Where* it came from. I shall conclude this dissertation by enquiring, whether you remember the Epicene nouns.

Lady Mary.

Are they not those which may with equal propriety be applied to the Masculine and Feminine Gender?

Mentoria.

You are perfectly right, as to the general idea. I shall enumerate a few particular instances; which I hope, will enable you to form a competent knowledge of this branch of Grammar. Example, The terms, Parent, Children, Friend, Neighbour, Cousin, Servant, are all Epicenes.

C

Lady

Lady Louisa.

My dear Mentoria, nothing can be more clear. Lord and Lady H. are my Parents, Lord George and myself are their Children. The Duke and Dutcheſs of D. are my friends, Sir Charles and Lady F. my neighbours; Lord William and Lady Frances S. my Couſins, and Thomas and Kitty, Servants.

Mentoria.

It gives me great pleaſure to find your Ladyſhip ſo attentive to my inſtructions: you could not poſſibly have given me a ſtronger proof of your proſiting by them, than the juſt compariſon you have drawn.

Lady Louiſa.

I hope I ſhall ſoon be able to expreſs myſelf with great accuracy. I am ſure, my good Mentoria, you will learn me to ſpeak and write juſt as I ought.

Mentoria.

There requires nothing more to produce this happy change, than a fixed determination to obſerve and imitate the converſation and conduct of thoſe, who are eminent for their great attainments. You were guilty of a palpable miſtake in the ſpeech you have juſt made. You ſaid, I ſhould learn you to ſpeak well:
when

when in reality, the instructor *teaches*, and the scholar *learns*. I shall beg you for the future, to attend to this distinction. Perfection in any art or science, is not easily attained: you must not imagine you have gotten to your journey's end, when in reality you are advanced but a few paces; yet be encouraged by the pleasing assurance, that every step you take, removes you farther from ignorance, and will at last conduct you to the goal of wisdom!

Lady Mary.

As you have frequently enjoined me to ask the meaning of every word I do not comprehend, I beg you will inform me what Science is?

Mentoria.

Your Ladyship has anticipated my intention; as it was my fixed purpose to reserve the discussion of that point to some future opportunity. A laconic or concise answer must suffice for the present; as I intend to subjoin a few remarks on the articulation of letters and words, and also point out some capital mistakes, as they appear to me necessary appendages to the foregoing observations. Science is a general term for all human learning; though when annexed to the idea of Arts, is

confined to those taught in the universities, or other seminaries of learning; such as grammar, astronomy, logic, rhetoric, arithmetic, geometry, and music.

Lady *Louisa*.

My dear Mentoria, as you are going to enumerate errors in speech, I suppose, Miss Simple will furnish you with many examples. I observed, the last time I was in company with her, she pronounced many words wholly different from what I am taught.

Mentoria.

I suppose, my dear, she has not been instructed at all; or, what is still worse, probably slighted the admonitions of her Governess, who might, notwithstanding, be a sensible, well-bred woman. I have observed, amongst many other errors, she always says *perdigious*, instead of *prodigious*; or if she means to describe a person of an open and candid disposition, she expresses herself by the word *ingenious*; which she mistakes for *ingenuous*. If she describes an outrageous person, she says, They are *obstropolous*, instead of *obstreperous*. Speaking of a venomous creature, she said, it was an *obnoxious* animal; which she mistook for the word *noxious*, which signifies the being
hurtful

hurtful in its nature; the term *obnoxious* only implying the being liable, or subject to any thing. Whenever she talks of a person in a weak state, who is obliged to be dieted, she says, he is reduced to a *regiment*, instead of *regimen*. If she intends to describe the usual methods, which are taken to bring an offender to justice, she informs you, he is *persecuted*. She is totally ignorant, the word *persecute* is improperly applied, except to express the hardships many have undergone, in defence of their religious principles; and does not, in the least, convey the idea of a legal *prosecution*.

Lady Mary.

I often blush for her, when she pretends to speak French; as she generally pronounces it improperly.

Mentoria.

I have heard her frequently say *bone mott*, for *bon mot*; *fox pass*, for *faux pas*. Or if she meets with the word *corps*, which signifies a collective body of men, she calls it *corpse*, which, in English, means a dead body. The other day, she was describing a fracas, or disturbance, which had happened in the family; which she declared was the worst *fracas*, she had ever seen.

Lady *Louisa*.

Upon my word, my dear Madam, the errors of Miss Simple's conversation appear to me in so disagreeable a light, I do not think I shall ever take pleasure in her company. Whenever I hear her speak, I shall endeavour to correct her errors.

Mentoria.

Your intention, my dear Lady Louisa, is very good; yet I would ever wish you to avoid a conscious superiority. A degree of modest diffidence should attend all your actions. Whenever you give your opinion, (which, at your age, ought never to be done unasked) you should deliver your sentiments with deference to those of superior judgment. This turn of mind will not obscure your merit, as modesty adds a grace to every other virtue.

The modest snow-drop, emblem of fair truth,
Conveys a lesson to the thoughtless youth;
That unassuming worth will ever find
A warm reception, in a gen'rous mind!

Lady *Mary*.

My dear Mentoria, I suppose you will now
give

give some directions, how the different letters are to be articulated.

Mentoria.

I will endeavour to express my sentiments as concise as possible, and never use technical terms, but when they are absolutely necessary.

Lady Louisa.

Pray, what are technical terms, my dear Mentoria? I never heard of them before.

Mentoria.

They are those terms, which belong to any particular art or science. A knowledge of which cannot be acquired, but by applying diligently to the arts; or attention to the conversation of those, who are conversant in them. The language of an architect, painter, or mathematician, would appear unintelligible to you: yet no other words would so well express their meaning.

Lady Mary.

Now, my good Mentoria, pursue your plan.

Mentoria.

I shall begin, by informing you of the use of Diphthongs. Example. *Æsop* is to be read *Esop*; as the double letter takes the sound of the single *E*. The words *Oedipus*, and *Oeconomy*, are pronounced agreeable to the same rule.

When two consonants precede a vowel, that, which joins to the vowel forms the sound, as in the word *Ptolomy*, which is read *Tolomy*: as also *Czar*, the title of the Emperor of Russia, usually called the *Zar*. I shall now specify a few instances, where the *H* is mute; as in the word *chart*, which signifies a map, and should be pronounced *cart*. The words *chaos*, and *chalybeate*, are subject to the same rule; as also *magna charta*, which is the law that constitutes the freedom of the English nation. When two letters of the same sort join, the first is generally sounded hard; as in *access*, *accept*, *accelerate*. An exception to this rule is evident, in the words *accord*, *accuse*, and *accumulate*. When an *N* follows an *M*, the sound of the *N* is wholly lost; as in *hymn*, *condemn*, &c. If a *G* precedes *N*, the former bears no part in the sound; which is evinced in the words *malign*, *benign*, *reign*, and *feign*. When an *H* follows a *P*, they neither of them preserve their natural sound, but are compounded into that of the letter *F*; as *physician*, *phosphorus*, and *philosopher*. I will not, my dear, at present, give any other instance, to enforce what I have already said; so shall
now

now dismiss you, with an exhortation to retain those, I have just recited; which will induce me to enlarge soon on this, or any other subject: so adieu!



THE HISTORY OF THE

ROYAL SOCIETY OF LONDON

FROM ITS FIRST INSTITUTION

TO THE PRESENT TIME

IN TWO VOLUMES

BY JOHN HENRY LEE

DIALOGUE III.

W E D N E S D A Y.

On Politeness, Civility, and
Gratitude.

Lady Louisa.

PRAY, my dear Mentoria, what is to be the subject of your instructions this morning?

Mentoria.

I really have not determined that point; but believe, they will chiefly consist of reflections, that will naturally arise, from whatever engages our attention.

Lady Mary.

I have a great favour to ask my good Mentoria, but have scarcely courage to tell you what it is: yet I think you would be inclined to grant it.

Mentoria.

Mentoria.

Why should your Ladyship scruple to make your requests known? There are very few improper, if they are presented with modest diffidence, and in deference to superior judgment. This turn of mind the French call *mauvaise honte*, which signifies false shame; from which I would wish you wholly exempt. I am ever inclined to promote your amusement; and dare say, in the present instance, I shall have no cause to reject your petition.

Lady Mary.

To keep you no longer in suspense, Lady Louisa and myself with you would permit Lady Jane Placid, and Lady Ann Sprightly, to spend a day with us.

Mentoria.

So this, my dear Lady Mary, was the mighty affair, you could not summon courage to utter! I not only give my consent to it, because I do not disapprove of it, but from the stronger inducement, of wishing you to form an intimacy with them; as they are the kind of companions, I wish you to associate with.

Lady Louisa.

Which do you like best, my dear Mentoria, Lady Jane Placid, or Lady Ann Sprightly?

Mentoria.

Mentoria.

Their qualities are so very different, it is difficult to determine, which is the most worthy of admiration. They both possess great merit, though in such a different line, they will not admit of a comparison; as Lady Ann's vivacity enlivens Lady Jane's composure and serenity; and Lady Jane's complacency keeps Lady Ann's cheerfulness within proper bounds. Thus you see, they both derive advantage from the contrast which is found in their characters.

Lady Mary.

May we invite Miss Simple the same day?

Mentoria.

By no means: you should always endeavour to form your party of such persons, whose sentiments and pursuits are supposed to agree. Lady Frances Trifle, and Lady Betty Hoyden will be more suitable to Miss Simple.

Lady Louisa.

How shall we divert ourselves, my dear Mentoria? I hope, you will give me leave to make tea.

Mentoria.

You must regulate your own amusements, and perform the duties of the table, both at dinner and tea; as I shall spend the day out,
that

that I may not check your mirth; which, I hope, will not exceed the bounds of good sense and politeness.

Lady Mary.

I am afraid, my dear Mentoria, we shall be very uncomfortable without you; and be at a loss, how to entertain our guests.

Mentoria.

To obviate this objection, I shall lay down a few rules, to regulate your conduct on this, and future occasions. Refinement in manners, is the only quality which can distinguish you from the lower class of people; as sincerity, benevolence, and many other virtues, are not confined to any particular station in life: though politeness, or what is usually called good breeding, is never possessed but by those whose understandings are cultivated, and their manners formed by the society of polite, well-bred persons.

Lady Louisa.

Will the keeping company with polite people make me the same?

Mentoria.

Unless it is your Ladyship's own fault, by obstinately persisting in your errors; or by inattention, the neglecting to make observations on the manners you ought to imitate. This
kind

kind of conduct undoubtedly would prevent your making any improvement, and would be as absurd, as if you were to shut your eyes at an exhibition of fine pictures; which would prevent your drawing any copy from the originals.

Lady Mary.

Pray, my dear Mentoria, instruct us how to behave the whole day. I should be very sorry, if we spoke or acted improperly to Lady Jane, or Lady Ann, when they favour us with their company.

Mentoria.

It is scarcely possible, to form a settled plan for behaviour, as there are so many circumstances, on which the propriety of it depends: so, that it can only be regulated by good sense and discretion, which will ever dictate what is proper to be performed on every occasion. But notwithstanding I cannot reduce politeness to a regular system, I will endeavour to point out a few of its essential qualities.

Lady Louisa.

How should we receive our visitors, my good Mentoria?

Mentoria.

You should endeavour to express, how happy you are to see them; that you have thought
it

it long, since you had lost that pleasure. You should then enquire after their own health, and that of every branch of their family: and if any have been ill, congratulate them on their recovery. Respecting amusements, you should never consult your own inclination, but always let those of your guests take the lead; and never raise trifling objections, to any they propose. As their entertainment is the chief object, you should readily comply with whatever seems conducive to it. It would make you appear petulant, as well as unpolite, if, when they expressed a desire to play at Questions and Commands, you seemed discontented, and declared a preference to play at Blind-man's-Buff. It is also incumbent on you, to check any little disputes, between your younger sisters and brothers; and so far from taking the least part in them, you should wholly suppress them. This conduct will make you appear in an amiable light, and give Lady Jane and Lady Ann a favourable impression of you.

Lady Mary.

I hope, by the help of your kind instructions, we shall behave with propriety, particularly at dinner time.

Mentoria.

Mentoria.

Do not suffer your attention to your guests so wholly to take up your thoughts, as to make you forgetful of the superior obligations, you owe to your Creator: return him thanks for the blessings he has already granted, and implore his future mercies, before you partake of the repast, his Providence has afforded you. When this duty is performed, help your friends to those parts you think best, and which, in general, seem in the highest estimation. Let the attention you pay them, prevent their requesting to be helped to any particular dish. If they express their approbation, and seem to give a preference to any part of the entertainment, you should request them to testify how much they like it, by eating some more of it. But if they decline your intreaties, do not repeat them; as persons, who are accustomed to good company seem as much at their ease, when they dine out, as when they are at home, and take it for granted, they are as welcome in their friend's house, as their friend would be in theirs. I would advise you, at your own, or at any other table, never to choose those things, that are rarities, or of which there seems but a small quantity:
though

though I would wish this denial not to be visible, lest it occasion compliments, and give pain to those, who have chosen the things you refused. There is another circumstance, I shall mention, which is, never to be warm in the praise of your own victuals, or ever mention what they cost. Also, when the dinner disappears, never make it the subject of your conversation: the excellence of a pie, or pudding, should never be extolled, but when it is on your plate; as, at the most, they deserve but few commendations. Let me intreat you, to close your meal with thanksgiving and praise to the great Cause, from whence it proceeded; which will inspire your mind with ease and cheerfulness.

Lady Louisa.

But what shall we talk of, my dear Mentoria, when dinner is over?

Mentoria.

That does not wholly depend on your Ladyship, as conversation consists of the sentiments of different persons, mutually expressed, without reserve. Some have the gift of enlivening this pleasing intercourse, by the brilliancy of their wit; others add a grace to it, by the depth of their judgment: whilst there
are

are many, who possess no extraordinary qualifications, yet are, nevertheless, pleasing companions; because they are conversant in the affairs of the world, or pay attention to others.

Lady Mary.

Ought I, my dear Mentoria, to enquire what work they are about, what books they have read, or where they have been?

Mentoria.

Yes, my dear, though the bare reply to these questions ought not to satisfy your Ladyship. When you are informed of their different pursuits, enquire how far they are advanced in their embroidery; and whether they think it possible you could execute a piece of the same nature. Respecting books, you should express a desire to know their opinion of those they have read, as well as yourself, to find if their sentiments correspond with your own; and also of new publications, and authors to which you are a stranger: that by their account you may form an idea whether they would improve or entertain you. In the recital of what they had seen, or where they had been, you would naturally be led to enquire into the different situation of the places; which they liked best, and on what account they gave the preference. These enquiries will furnish
ample

ample matter for conversation, and enable you to pass your time agreeably.

Lady Louisa.

I have observed many people tiresome in their conversation, and not the least entertaining.

Mentoria.

I have met with many in the course of life, who may not unjustly be compared to a pump, from which the water is drawn with difficulty; and also with others, who, from their pleasing volubility, may be compared with equal propriety to a flowing river.

Lady Mary.

I shall also tell them what lessons we learn; and enquire whether they are taught the same.

Mentoria.

I am pleased, my dear Lady Mary, to find you are desirous to form a degree of comparison between their improvement and yours; as it will excite emulation, and create in your mind a strong desire to make a rapid progress in your learning. For my own part, if I were a little girl, nothing would mortify me so much as the being remarkably backward of my age; a tall girl is more particularly bound to hasten her improvement, as persons in general form great expectations from her external

ap-

pearance, and are extremely disappointed to find an infant mind, in almost a woman's body; expressing their astonishment in the following terms; "What pity it is so large a casket should contain such a bauble!"

Lady Mary.

Do you think, my good Mentoria, my mind is a bauble!

Mentoria.

You should never, my dear, suppose yourself the person pointed at in any general observation; as it is a maxim of true politeness to exempt the present company from any personal reflection. The intrinsic value of your mind, depends on the care you take to embellish and adorn it. Like the diamond in its natural state, it is unpolished; the one derives its lustre from the skill of the lapidary, the other from education.

Lady Louisa.

I have a great inclination, my dear Madam, to give Lady Jane Placid one of my pretty trinkets; I am sure she will like it, it is so beautiful.

Mentoria.

I have not the least objection: but would advise your Ladyship not to enumerate its beauties when you present it; but rather tell her
it

it is a trifle, and not worth her acceptance; yet you hope she will receive it as a token of affection. You should never enhance the value of any favour you confer; but always endeavour to point out the perfections, and increase the worth of those you receive. The mention of benefits reminds me to warn you, not to speak of those you confer, before, or to the person, on whom they were bestowed: as it entirely cancels the obligation, and clearly indicates you performed the service more from ostentation than friendship!

Lady Louisa.

I will never, for the future, speak to my servant of any favour she receives from me. I used to be perpetually telling her what returns I expected for my kindness, and never thought she could do enough for me!

Mentoria.

To convince you how different my sentiments are in this respect, I never exact, or even with a return for any service I perform; though I endeavour in every instance to testify my gratitude to those persons who have obliged me.

Lady Mary.

I hope, my dear Mentoria, I shall acquit myself properly at the tea table; I shall be less

at

at a loss, because I have often made tea for you.

Mentoria.

I make no doubt your guests will be perfectly satisfied, as a wish to please, generally produces the desired effect. Attend to the necessary forms; and endeavour to make the tea agreeable to their taste: you must also be careful not to stop the table, overset the urn, or be guilty of any thing to cause confusion and disturbance.

Lady Louisa.

That would be a sad affair, as it would turn all our joy into sorrow! but how, my dear Madam, are we to be employed after we have drank tea?

Mentoria.

You should propose several kinds of amusements, and when the ladies have determined the choice, pursue it without deliberation, for fear their carriage should fetch them when you are in the height of your diversion; which might perhaps oblige you to leave it.

Lady Mary.

How must I take leave of them: I am sure I shall be sorry to part with friends I so much esteem.

Men-

Mentoria.

Your feelings will suggest to your Ladyship the best mode of expressing them, which I should suppose will be to this effect: that you regretted being deprived of their company so early, and that you had no idea it was so late, you had been so happy in their conversation. You should also desire them to present your love, or compliments, to every part of their family.

Lady Mary.

I think, my good Mentoria, you seem to have regulated our conduct, from the time of the ladies coming into the house, to their departure from it, by your kind instructions.

Mentoria.

Yet it may not be unuseful if I extend them a little farther, to direct your behaviour after they are gone. Nothing is more usual or disgusting, than to see persons of all ranks and degrees, criticise on the dress and general deportment of their departed guests; and often ridicule and condemn those things behind their back, which, to their face, they approved or applauded. Let me intreat you never to make your friends appear in a disadvantageous light, but, on the contrary, extol the perfections

tions and accomplishments they possess, and cast a veil over their defects.

Lady Louisa.

I shall observe this rule, never to make a jest of any person, particularly of those with whom I live on terms of friendship.

Mentoria.

I hope your Ladyship will keep to this excellent resolution; for my own part, when I see people wounding the reputation of their friends, I always expect to come in for my share of the general slaughter. Nothing but arrogance, and an exalted idea of our own consequence, can shield us from this fear; as there is no character so perfect, but what there can be some fault or weakness discovered in it, which like the spots in the sun (if viewed through a proper medium) do not take from its radiant lustre.

Lady Mary.

I did not know there were any spots in the sun, my dear Mentoria.

Mentoria.

We can perceive them very clearly by the help of a telescope; as to pursue the simile, by the aid of discernment, we discover the blemishes of the human mind.

D

Lady

Lady Louisa.

Why, my dear madam, do you compare the sun to our understandings?

Mentoria.

For these reasons, they are respectively the most glorious works of the creation, and often shine with resplendence, though they are sometimes obscured by clouds.

Lady Mary.

What clouds can possibly affect the mind, and take from its lustre?

Mentoria.

Those of ignorance, prejudice, superstition, and every other quality which makes us deviate from our duty, or impedes our pursuing any laudable purpose.

Lady Louisa.

Pray, Mentoria, what is the distinction between Politeness and Civility?

Mentoria.

There is a very essential difference, and may be defined thus: civility consists of good offices performed by impulse or instinct, whilst those which are classed under the rank of politeness, are produced by reflection, and proceed more from the head than the heart.

Lady Mary.

May a person be extremely civil who has not the least pretensions to politeness?

Mentoria.

Mentoria.

Undoubtedly; a ploughman may possess civility in the highest degree. When he takes off his hat as your Ladyship passes, or moves a hurdle to facilitate your getting over a stile; he acts as much in character, and renders you as substantial a service, as a fine gentleman would, by handing you into your carriage, though you ought to express your acknowledgement in very different terms.

Lady Louisa.

In what else do these agreeable qualities differ?

Mentoria.

It often happens the distinction does not arise from the difference of the actions themselves; but proceeds only from the superior grace with which those of politeness are performed. If we trace minutely the various operations of life, we shall find in general, those in a high and low state, are employed in nearly the same pursuits, are impelled by the same motives, and differ not so much in the plan as in the execution of their scheme. They talk, read, walk, eat, and perform every function allowed to human nature; yet what a different effect they produce? they scarcely seem to admit of a comparison.

The discourse of a clown, does not sound like the same language, with that which flows from the lips of an orator; neither does his ungraceful step appear to be produced from the use of the same organs, which charm us in the graceful motion of a well-bred man or woman: to close the comparison, how essentially the uncouth and hasty meal of the farmer, differs from the luxurious and elegant repast of the fine gentleman; the one is regulated in his actions by nature, which produces civility; the other by refinement, which constitutes politeness. To pursue my usual plan of preferring mediocrity in all things, I wish those with whom I associate to have a portion of these different qualities blended in their characters; that from nature they may derive sincerity, and from refinement, those graces which are its best ornaments!

Lady Mary.

I hope, my dear madam, by my care and assiduity, to reward you for the pains you take with me. Is not Gratitude an amiable quality?

Mentoria.

Certainly, my dear, it is a virtue which ought to be cherished, as it is but seldom practised. The generality of the world content themselves

themselves with the bare acknowledgment of an obligation, and, scarcely ever seek an opportunity to return it, which is the more extraordinary, as it is a debt every one has power to pay, which Milton thus expresses: "A grateful mind, by owing owes not, but still pays, at once indebted and discharged!" which implies, gratitude is the only tribute required, when it is not in your power to make a more substantial return for any benefit received.

Lady Louisa.

If acts of gratitude are so easily performed, I am surprized they are not more frequently practised.

Mentoria.

Persons in general are so eager in the pursuit of benefits, they no sooner gain one, than they seek to obtain another, which scarcely leaves them leisure for the exercise of this virtue; and also when they are possessed of the advantage, are too apt to forget the means by which it was acquired. As I know you are fond of poetry, I will repeat an invocation to gratitude, which I wrote some days ago.

Hail, gratitude divine, of heav'nly birth!
 Whence art thou found, a fugitive on earth?
 Where is thy dwelling, art thou doom'd to roam
 From pole to pole? yet find no friendly dome

To shelter thee from insult, and from pride?
Will no kind breast thy grief and cares divide?
Ill-fated maid, thy votaries withdraw,
Deny allegiance to thy sacred law.
Thy spotless altars, no oblations grace;
Thy favours wrote on sand the winds efface.
What tho' but few attend thy exil'd fate,
Thou'rt freed from pomp, and vain parade of
(state:
Deign but to hear thy modest suppliant's pray'r,
Let her thy silken bands for ever wear!

Lady Mary.

My dear Mentoria, I thank you for reciting those lines; but shall be more obliged, if you will explain them.

Mentoria.

It will give me pleasure, my dear Lady Mary, to point out the different allusions which they contain; as it will enable you to comprehend the sense of the invocation. The supposition that gratitude is of celestial birth, denotes the divinity of her nature; and the idea of her being a fugitive, fully expresses she is a wanderer from her native country. The passage:

Ill fated maid, thy votaries withdraw,
Deny allegiance to thy sacred law!

Thy

Thy spotless altars, no oblations grace ;
Thy favours wrote on sand, the winds efface !

Imply, that those who are bound by the strongest obligations, frequently neglect to make their proper acknowledgments, and refuse to pay the tribute which is due ; also that the favours we receive, make but a slight impression on our hearts, and are often erased by scenes of folly and dissipation, which are in their nature as light as air. The concluding lines

Deign but to hear thy modest suppliant's pray'r,
Let her thy silken bands for ever wear :

Clearly indicate my ardent desire to be guided by this divine virtue, whose yoke is easy, and burthen light, and of whom with propriety it may be said, her service is perfect freedom.

Lady Louisa.

From your description, my dear Mentoria, gratitude seems to be but in an uncomfortable situation, as she has no habitation ; and is obliged to wander far from her native-country to seek an abode.

Mentoria.

Let her then find an asylum in your breast ;
make frequent oblations at her shrine, which

must consist of universal charity and benevolence, as no other sacrifice is acceptable to her. Yield implicit obedience to her laws, bind yourself with her silken cords, and prefer them to the fetters of guilt, or the shackles of folly.

Lady Mary.

My dear Lady Louisa, we will, both of us, be votaries of gratitude, which shall be testified by duty to our parents, and respect to good Mentoria, for the pains she takes to improve us.

Mentoria.

Exclusive of the advantage I shall derive from the practice of this resolution, I rejoice in it, because it will influence your whole conduct, and regulate the actions of your future life. The duration of a building depends entirely on the structure of the foundation: if the basis be not firm, the edifice soon falls to decay, which evinces the necessity in the formation of a human character, to erect the fabric on the solid, and immutable principles of virtue and religion. Those who prefer superficial accomplishments to these divine attributes, may be compared to the foolish man described in the gospel, who built his house on the sand, which when the wind arose, and the rains descended, beat upon the house and it fell,
and

and great was the fall thereof. The simile may be defined thus: that those of unenlightened minds, are not fortified against the storms of affliction; nor are they able to surmount the difficulties they meet with in their warfare upon earth. The great fall of the building, denotes how transient and temporary all hopes of happiness prove, except those which are founded on religion and virtue.



TABLE I

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DIALOGUE IV.

THURSDAY.

On Elocution and Geography.

Mentoria.

BEFORE I begin the business allotted for this morning, I shall congratulate you on your brother's arrival from Harrow, and beg the favour of Lady Louisa to inform him, I shall be extremely glad of his company, which undoubtedly will be an addition to your happiness.

Lady Louisa.

My dear Mentoria, I will fetch him this moment; as I know he will rejoice to join our party.

(Lady L. returns, introducing her brother Lord George.)

You cannot imagine, my dear Mentoria, how rejoiced Lord George was to come, and he would bring his books to read to you.

Mentoria.

I thought it might be agreeable to your Lordship to spend some of your leisure hours with your sisters, which induced me to request the favour of your company. I will join with them in endeavouring to make the holidays as cheerful to you as possible. I hope, you will not think it lessens your consequence as a man, to be taught by a Governess, and have young Ladies for your school-fellows and companions.

Lord George.

Not in the least, Madam : I shall esteem myself much obliged to you, for permitting me to partake of your instructions.

Mentoria.

Pray, my Lord, who is your particular friend at school ? Do any of Miss Simple's brothers or cousins go to Harrow ? The family of the Simples are so numerous, I think wherever one goes, there is some branch of it.

Lord George.

I recollect several of that name ; but he who is the most remarkable, is Sir Simon Simple, cousin to the Miss Simple you know.

Mentoria.

By what quality is he so particularly distinguished ? I fear, by none that do him credit.

Lord

Lord George.

When we are conning our lessons he is playing at marbles, so that when his master is to hear his task, he cannot say it, for which he gets flogged; and when we are at play, he is blubbering and crying, with a fool's cap on his head.

Lady Louisa.

How I should laugh at him, and compare him to Midas with his asses ears.

Lady Mary.

I wish your Lordship could recollect any more instances of Sir Simon's folly.

Lord George.

You cannot imagine how diverting it is to hear him read: It is just like the tolling of a bell, he goes Ding, Dong, Dong! and lays such a stress on, *and, the, to,* and all monosyllables, that his Master has scarcely patience to hear him.

Mentoria.

I am not surpris'd at that, as nothing can be more tiresome than to hear a person read ill, and it is impossible to read well, without entering into the subject; but from your account, I take it for granted, Sir Simon has not sense enough to be deeply interested in any History. The only method to read with propriety, is to observe

serve the stops with great attention; and to avoid a monotony, as much as possible, by acquiring a proper cadence and modulation of the voice.

Lady Mary.

What is Monotony, my dear Mentoria?

Mentoria.

I can venture to pronounce your Ladyship is no stranger to the thing itself, though you are to the term which expresses it. It signifies the reading in one continued tone of voice; which is produced by neglecting to vary it, as the subject requires. Nothing can be more absurd than this stile of reading, as you should always endeavour to express the sense of the Author, and deliver his sentiments with as much ease and feeling, as if they were your own.

Lady Louisa.

I wish I could attain this degree of perfection.

Mentoria.

Simple narrative is the easiest kind of reading for young beginners; as it requires but little elevation and change of voice.

Lady Mary.

Pray, my dear Madam, what do you mean by simple narrative.

Mentoria.

Mentoria.

It is the recital of mere matter of fact; and consists in expressing in a natural and easy stile, the occurrences incident to human life.

Lady Louisa.

What is the most difficult to read well?

Mentoria.

Those compositions which abound with invocations, exclamations, and frequent interrogations; as they require to be read with dignity and grace.

Lady Mary.

I wish to know the meaning of invocations. I remember your repeating one on Gratitude.

Mentoria.

They are of several kinds, and consist in imploring the aid and assistance of a superior Power; they may be ranked in the following classes. Those addressed to the Deity—of which I shall produce an example from Thompson.

“Father of Light and Life, thou good Supreme,
“O teach me what is good, teach me Thyself!”

The next are those presented to Apollo, the Muses, or any Virtue, and are used by Poets to give a grace to their Compositions; and often to apologize for their want of abilities, which is manifested, by their desiring to be inspired with the gift of Poesy. To give you a clear
idea

idea of this poetic fiction, I shall repeat a few lines from a letter I sent some time since to a friend ; in which I invoked the Muse Clio, in the following words :

Hail, gentle Clio! form the verse,
In numbers musical, and terse ;
Diffuse thy softness o'er each line,
Friendship and Truth with grace combine!

Lady Mary.

I clearly comprehend the different qualities of these invocations ; but pray, what are exclamations ?

Mentoria.

They denote surprize or astonishment ; and often express our admiration of any extraordinary person, or thing. Such is the following instance, which is part of the panegyric bestowed on Great Britain, in Thomson's Seasons :

Heavens! what a goodly prospect spreads around,
Of hills, and dales, and woods, and lawns, and
 spires,
And glittering towns, and gilded streams, till all
The stretching landscape into smoke decays !

Lady

Lady Louisa.

We have now heard every part explained, except interrogation.

Mentoria.

There requires little to be said on this subject, as you cannot be ignorant, that to interrogate, is to question. I will however conclude this dissertation, with an example from Pope :

What, if the foot, ordain'd the dust to tread,
Or hand to toil, aspir'd to be the head ?
What if the head, the eye, the ear, repin'd
To serve, mere engines, to the ruling mind ?

Lady Mary.

I admire the instance you have produced, and shall take the liberty, my good Mentoria, to remind you of a promise you made yesterday.

Mentoria.

I recollect, and will instantly comply with it : Was it not to inform you of the nature of Geography ?

Lady Mary.

Yes, my dear Madam, and I am all impatience till you begin.

Mentoria.

Geography teaches you the form of the
Earth,

Earth, and the situation of each particular part of it. You are not ignorant, the World is round, and consists of Seas, Continents, Islands, Peninsulas, Rivers, Promontories, Rocks, and Mountains. In order to give you a clear idea of the Rudiments of Geography, preparatory to your being regularly taught, I shall endeavour to explain these different branches, and then proceed to enlarge on other parts of this useful Science. The Ocean is the main Sea, the depth and extent of which is past our finite comprehension. The principal Seas I can recollect are the Mediterranean, Baltic, Euxine, and Adriatic. The Continent is a vast united tract of Land, over which it is practicable to travel from one place to another: as for instance, from France to Germany, Italy, Spain, Portugal, Turkey, or even India, by passing over the deserts of Arabia; but this last is very dangerous, not only from the probability of meeting with the wild Arabs, and noxious animals, but also from the wind rising to a considerable height, which is always of fatal consequence to travellers, as the clouds of sand either prevent their pursuing the right course, or frequently blind them, and sometimes totally overwhelms them.

Lady

Lady Louisa.

Pray, what is an Island? My brother, I dare say, knows?

Mentoria.

Island is a general term for every thing encompassed by water. In the more elevated sense, it signifies any habitable place or Kingdom, surrounded by the sea, as Great Britain or Ireland. The advantages arising from this situation are evidently these; the convenience of importing into every part of it, the produce of other countries; and to those engaged in commerce, the equal advantage of exporting such commodities, which the soil or manufactures bring to perfection. I shall not attempt to enumerate the particular Islands, but content myself with informing you, they are found in greatest abundance in the West Indies; many of which are so small, as to be the private property of a few persons.

Lady Mary.

I never knew before that England was an Island: and always thought every thing we ate, drank, or wore, was the produce of our own Country.

Mentoria.

Your Ladyship was much mistaken; on the contrary, we are indebted to other Countries
and

and Nations, for many of the conveniencies of life. India supplies us with Tea, Spices, Drugs, Rice, China, Muffin, Precious Stones, and various other Articles. The West Indies, with Sugar, Coffee, Rum, Tobacco, Chocolate, Mahogany, Spices, Drugs, &c. &c. Italy furnishes us with most of the Silks we wear; as mulberry-trees, (on the leaves of which, Silk-Worms feed,) are the natural growth of the country, and are as common there, as the oak, elm, &c. are in England. The Silk comes over in its natural state, is afterwards dyed of various colours, and manufactured into the different kinds of Silk and Sattin we wear. Spain and Portugal produce most of the Wines we drink. France affords us Brandy, Claret, and some other Wines, with many ornamental parts of dress and furniture. Norway is famous for timber, of which ships and many other things are built. Russia, Dantzic, and most of the Northern countries abound with animals of various kinds; some docile, others ferocious, many of which are valuable on account of their skins; such as the furs of the Ermine, (which is the skin of a little animal very much like a weazle, and is generally called Miniver) Sables, Squirrels, Bears, &c. &c. It was wisely ordained by Providence to furnish

furnish the inhabitants of the Northern regions with such ample provision for warm raiment, as the coldness of the climate indispensably requires. In England, there are quarries of stone, and mines of lead, tin, and coals; also in different parts of the world, quarries of marble, and mines of gold, silver, precious stones, and iron, which, to enumerate, would carry me beyond my present purpose.

Lady Louisa.

Pray, Mentoria, what is a Peninsula? Is it not something like an island?

Mentoria.

You are perfectly right, my dear Lady Louisa. It is a tract of land almost encompassed with water. The French call it *presque isle*, which, in their language, so clearly expresses the sense, it requires no explanation. The neck of land which prevents it from becoming an island, is called *isthmus*. It consists of a piece of land which usually runs between two seas, and joins a peninsula to the continent.

Lady Louisa.

I believe the next thing you are to explain, is rivers: I think you need not give yourself the trouble, as we know what they are.

Mentoria.

You have undoubtedly seen the river Thames;
but

but I am certain you cannot trace the source from whence that and other rivers spring.

Lady Louisa.

Does it not begin at London, and end at Richmond.

Mentoria.

I thought that was your Ladyship's idea, which is a false one; as they usually proceed from a spring or fountain, and empty themselves into some sea. The sea constantly ebbs and flows, which constitutes what are called Tides; this flux and reflux, renders the water more wholesome and agreeable than lakes of stagnated water, which cannot lose the impurity they contract. Vessels also, from all parts of the world, come up with the tide to the port of London, and as a natural consequence, are conveyed from thence by the return of it.

The Thames is the most famous river in England; there are many other of less consequence, which I have not leisure to enumerate. I shall only particularize the following: the river Avon, which has often been celebrated on account of the great poet, Shakespear, being born at a place called Stratford-upon-Avon. The rivers Isis and Cam, are also famed for their vicinity to the two universities of Oxford and Cambridge; it is almost needless to add, the latter

latter derives its name from a bridge being built over the river Cam. I cannot conclude this conversation on rivers, without adding some account of the Nile. As it scarcely ever rains in Egypt, the soil would be quite unfruitful, if it were not for the salutary effects of this wonderful river. It begins to rise at the latter end of May, and continues to do so till September or October, when there are channels cut to let it into the great canal which runs through Cairo, from whence it overflows the fields and gardens. This joyful event is announced by a public festival, fire-works and every demonstration of joy. The mud which the stream of the Nile carries with it, manures the earth, and makes it fit to receive the different kinds of grain, which in a month or two after it is sown, yields an abundant harvest. The Nile is so very beneficial to the Egyptians, it seems to have been designed by Providence as a sovereign remedy for all their evils, as even the plague, (which visits them once in six or seven years) a disorder of the most malignant and fatal tendency, yet when the Nile overflows, this heavy scourge ceases. The cause is evidently this, all contagious disorders arise from the vitiated state of the air in extreme drought and heat, which is allayed by inundations

tions or refreshing showers, and diffuses health to the inhabitants of such unfavourable climates.

Lady Mary.

Pray was not the famous Cleopatra, queen of Egypt?

Mentoria.

Yes, my dear, though I believe we must consider her character and conduct, under the head of Roman history, as it is so inseparably connected with that of Mark Antony. It may not be amiss to inform you, the vagrants usually called gypsies are reckoned natives of Egypt. When the Sultan Selimus conquered the Egyptians, in the year 1417, they refused allegiance to his laws, and retired into the deserts, living only by theft and plunder; at length they were banished from Egypt, and agreed to disperse themselves in small parties into every country in the known world. The art of magic, in which these people were allowed to excel, gained them in that unenlightened and credulous age, the reputation of foretelling events by the course of the planets, and other mysterious means. This opinion is now wholly exploded, and could never gain belief, but in a country absorbed in the grossest idolatry. Those who believe and acknowledge the omnipotence

omnipotence of God, can never suppose any inferior power possesses fore-knowledge of any event incident to human life; as that alone belongs to the Creator of the universe, in whose hands are the issues of life and death!

Lord George.

I agree with you, my dear Madam, in thinking none but very weak people can believe such absurdities; but I will not interrupt you, as I suppose, you will now tell us what a Promontory is.

Mentoria.

A Promontory is a hill or point of land, which stretches itself over the sea; and is often called a Cape.

Lady Louisa.

What is a Mountain, my good Mentoria? I know it is a very large thing.

Mentoria.

It is a vast mass of earth; and when in a less degree it is called a Hill. Wales abounds with mountains, on which the wild goats browse. The Alps are very high mountains, which separate Germany from Italy; there is a passage over them, though rather dangerous. The tops of these mountains are always covered with snow; notwithstanding in the valleys beneath, there is the finest verdure. The Pyrenean

E mountains

mountains divide France from Spain. The burning mountains of Vesuvius and Ætna, are wonderful phenomena of nature. The volcano, called Mount Ætna, is in the Island of Sicily, in the Mediterranean Sea, under the government of the King of Naples. The eruption of fire which bursts from it, is called the Lava; the top of the mountain from whence it proceeds, is stiled the Crater, or bowl. There have been whole towns laid in ashes by the streams of fire and combustible matter, of which these mountains are composed; as wherever they issue or flow, they cause certain destruction.

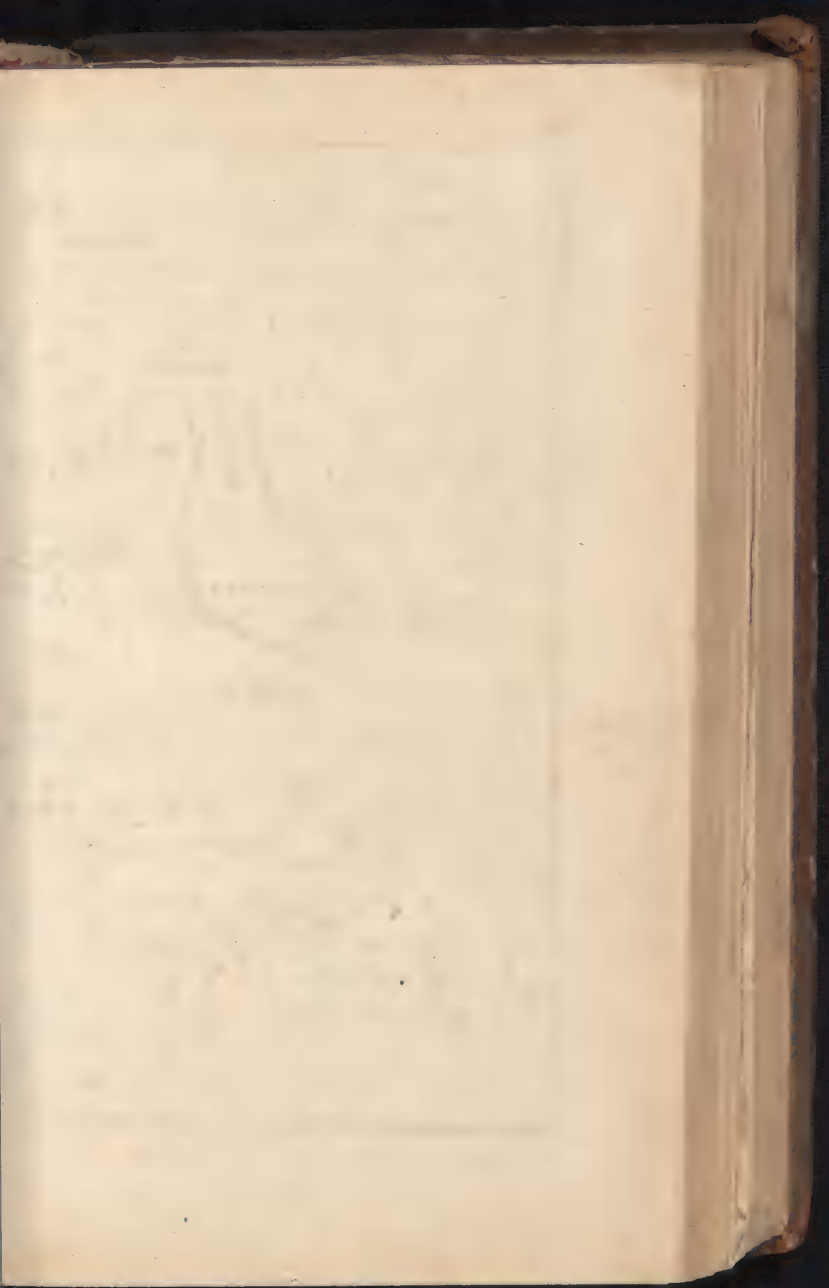
Lord George.

I should like very much to see Mount Ætna, and suppose I shall, when I make the Tour of Europe. Pray, Mentoria, what is the difference between a Rock and a Mountain? I think that is the next, and last branch you have to explain.

Mentoria.

Rocks are formed of a substance proverbially hard; and the surface rough and uneven. They are situated in and near the sea, and are often pernicious to mariners: as the calamity usually called shipwreck, is produced by the ship striking on a rock, which either dashes it to pieces, or casts it upon some desolate Island.

The





The Baltic Sea abounds with rocks. Hence it is, the voyages to Norway, and Denmark, are more dangerous than any other; and consequently wrecks are more frequent, in that, than in any other Sea. There are rocks in the Straits of Messina, called Scylla, and Charybdis, which are situated so critically, and the passage between them so narrow, that, whilst the mariners are striving to avoid one, they frequently split on the other.

Lady Mary.

Have you quite finished, my dear Mentoria?

Mentoria.

For the present, my dear, having drawn you a rough sketch of the different parts of a map, which, I hope, will serve to impress my instructions on your mind; as you will find the subject I have just treated on, fully explained, in Plate I.



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DIALOGUE V.

F R I D A Y.

On the Derivation of Words, and Geography.

Lady Mary.

I Do not mean, my good Mentoria, to prescribe the subject of your instructions; yet I was so much pleased with the derivation of the word *Cambridge*, I wish you could recollect any instance of the same nature.

Mentoria.

I will readily comply with your request, my dear Lady Mary; and though the instances I may produce, will not perhaps answer so literally, their reference will be equally just, to some cir-

cumstance or word, in a foreign language; which expresses the sense, and constitutes the meaning. For example: the word *quadripede*, which signifies a four-footed animal, is derived from the Latin, and literally means *four feet*. The *Adelphi* was called by that name, because it was built by brothers, which in Greek is expressed by the word *adelphos*. *Virginia* was discovered by Sir *Walter Raleigh*, in the reign of Queen *Elizabeth*, and called so, as a compliment to her, as she was never married.

Lady Louisa.

I hope, my dear *Mentoria*, you will point out some more examples; as I am much pleased with those you have produced.

Mentoria.

Philadelphia, a settlement in America, which is chiefly inhabited by Quakers, took its name from the particular tenets of that sect; which are a system of philanthropy and brotherly love. (Though I am no Grecian) I presume, the word *Philadelphia* is derived from the Greek, and means *brotherly love*, from *φιλεω* to love, and *αδελφος* a brother. The *Cape of Good Hope* was discovered by the French, in endeavouring to find the North-West passage, which afforded them refreshment,

ment, and inspired them with the *hope* of making other useful discoveries: hence they called it *The Cape de bonne Esperance*.

Lord George.

I wish you could tell the cause, from whence every thing takes its name.

Mentoria.

I shall now inform you, from whence that Quarter of the world, called *America*, derives its origin. This vast tract of land was discovered by Christopher Columbus, a native of Genoa. Affairs of such great importance cannot always be completed by the projector: hence it was, that Americus Vesputius, a Florentine, immortalized his name by completing the work Columbus began, who undoubtedly had the greatest merit: notwithstanding, the whole country derived its name from *Americus Vesputius*; and as names of places are usually feminine, it was called *America*.

Lady Mary.

I think that was extremely unjust: I should think it very hard, if my sister did a few leaves in my flower-piece, to have it called her basket of flowers.

Mentoria.

If we seriously consider, Columbus does not seem in such a pitiable, nor Americus Vespu-

tius in such an enviable state, as at first sight we are apt to imagine. All persons of sense and learning ascribe the merit to Columbus; whilst Vesputius, who arrogantly thought to engross the whole honour of the discovery, is disappointed, by (I venture to pronounce) half the world's not knowing from what, or whom, America took its name. I shall now subjoin a few observations on Geography; which, I hope, will entertain and improve you.

Lord George.

I am extremely glad, as it is a subject, which deeply engages my attention.

Mentoria.

I have already told you, the world is round: it is necessary, you should know it is convex.

Lady Louisa.

Pray, what is *convex*, my dear Mentoria?

Mentoria.

Convex is directly opposite to *concave*. To familiarize the idea: the outside of a tea-cup is *convex*, and the inside *concave*. I shall now inform you, the top of the sphere or globe is called the Zenith: hence it is, this term is often used in a figurative sense, to describe a person in the most exalted state, by saying, they are in the zenith of their glory. The bottom of
the

the globe is called the Nadir: I thought I might, with equal propriety, use this term to express a state of depression, directly opposite to the elevated situation, the word *Zenith* denotes; which I did in the following lines, though I can produce no authority for it.

The same when in the Zenith of thy state,
Or in the Nadir of afflictive fate!

Lady Mary.

I never heard of these things before: pray, Mentoria, where did you get your knowledge?

Mentoria.

I am not conscious of possessing any extraordinary degree of knowledge: what I have attained, was by industry and observation. I have read a great deal, and was always desirous to keep company with persons older than myself. The deference I had for their judgment, which I knew was the result of long experience, induced me to follow their advice: hence it was, I escaped many errors, and was enabled to form my sentiments by the rules of prudence and discretion. I shall now explain to you, what the Antipodes are.

Lady Louisa.

I cannot imagine what they can be: I never heard of them.

Mentoria.

They are those persons, who inhabit parts of the globe directly opposite to each other: consequently, as the world is round, the feet of the one must be directly parallel with the feet of the other. You will, I dare say, figure to yourself, that the antipodes walk on their heads, whilst you securely tread on your feet!

Lord George.

How, my good Mentoria, can it be otherwise? If a fly were to settle on the top of my cricket-ball, and another at the bottom, would not the latter seem to walk on his head?

Mentoria.

Undoubtedly; but the world moves on an axis, and (if I may be allowed the expression) is air-hung: the space, in which it is suspended is called the horizon.

Lord George.

Pray, Mentoria, what is an Axis?

Mentoria.

As your Lordship compares the world to a cricket-ball, I shall pursue the simile. If you were to thrust a stick through the center of your

your ball, which would enable you to turn it round, the stick, on which it moved, would be the axis.

Lady Mary.

Is it past a doubt then, that the world moves? I am surprized, we do not perceive it.

Mentoria.

There is not the least reason to question it. Hence it is, that we are the antipodes to those, who possess the opposite part of the globe. Our advantages are equal, though we enjoy them at different times. It is midnight with them, when it is noon-day with us. Their longest day is our shortest; and the length of their day is equal to the length of our night. The term *antipodes* is often used metaphorically, to describe those persons, whose sentiments and manners are diametrically opposite.

Lady Louisa.

I can scarcely believe, the world is in perpetual motion.

Mentoria.

The revolution of the earth on its own axis, is called the *diurnal* motion, which is performed in the space of twenty-four hours, and causes the succession of day and night. That part of the earth, which in the regular course

is hid from the light of the sun, must naturally be involved in darkness; which constitutes what is called night: whilst the opposite part of the globe is cheered by the rays of the sun, and enjoys day-light with all its attendant comforts.

Lady Mary.

I understand this very clearly: but what causes morning and evening?

Mentoria.

The oblique direction of the rays of the sun, which are produced by the regular gradation of the earth, in her process round the sphere, in which she moves.

Lady Louisa.

Pray, my dear Mentoria, do not close this entertaining subject so soon.

Mentoria.

It is not my intent, my dear Lady Louisa. I shall now proceed to explain, what causes the vicissitude of heat and cold, and the regular succession of the seasons. The earth, as a planet, performs its course round the sun in three hundred and sixty-five days, which is called a solar year. Heat is occasioned by the rays of the sun being transmitted in a perpendicular direction; and cold from the cessation,

or

or obliquity of its rays. The different seasons are produced, as a natural consequence, by our being near, or distant from the sun; which makes us feel its power, in a greater or less degree. The gradual change from one season to another, is produced by the regular process of the earth's revolution round the sun. I shall now proceed to explain the different climates, which are classed under the title of Zones.

Lady Mary.

I think, I have read of people wearing zones; so that it appears not probable, any part of dress can have the least connection with Geography.

Mentoria.

Zone signifies a girdle, or any thing which encompasses: hence it is, these divisions of the earth are called so, because they go round the globe. There are five zones; one *torrid*, which is a term for extreme heat; as the sun is vertical, or directly over the head twice every year, and also produces no shadow: this climate is intensely hot. The countries, situated under the torrid zone, are the Continent of Africa, Guinea, Lybia, Abyssinia, Arabia Felix, East India, some part of America,

rica, and New Guinea, with many islands, the inhabitants of which are chiefly black.

Lady Louisa.

I should not like to live under the torrid zone; should you, Mentoria?

Mentoria.

Certainly none would choose a situation, where the disadvantages are so evident. We are now going to consider the two *temperate* zones (under one of which, we are so fortunate to be placed.) They are called so, from being situated between the torrid and frigid zones; and are distinguished by the Northern temperate zone, and the Southern temperate zone. Under the former England is situated, Spain, France, Germany, Italy, Scotland, Ireland, the greatest part of Norway, Sweden, Denmark, Poland, Russia, the Lesser Asia, Naxos, Greece, Judea or Palestine, Assyria, and the chief part of the Greater Asia, viz. Armenia, Persia, part of India, of great Tartary, and of China, Japan, and the chief part of North America, with many islands. Under the South temperate zone lie the uttermost part of Africa, and the Cape of Good Hope; as also a great part of South America.

Lady Mary.

I suppose, we shall now hear about the frigid zones, which you just now mentioned.

Mentoria.

Mentoria.

The two *frigid* zones derive their name, from their situation being intensely cold. Under the North frozen zone, Greenland and Spitzbergen are situated, famous for the whale-fishery; with the greatest part of Tartary, the points of Norway and Swedeland, the heart of Lapland and Finland, the uttermost part of America, and the bounds of Europe. The boisterous winds, and rough seas, prevent the countries being well known, that lie under the South frozen zone. There have been many attempts made, which have hitherto proved unsuccessful, on account of the sickness, want of provisions, and other hardships the sailors must undergo in such a severe climate; which discourages them from making further discoveries.

Lord George.

If you were compelled to live under one of the zones, which would you prefer, the frigid or torrid?

Mentoria.

I will leave it to your own judgment, when I have explained the advantages and disadvantages incident to each. Providence has wisely ordained, that in those climates, where the

heat

heat disables the inhabitants from severe labour, there is an abundance of all the productions of the earth; and has granted the blessing of plenty, to compensate for the want of health, and other comforts their situation deprives them of. Riches seem indispensably necessary to those, who inhabit any hot country, as they not only minister the conveniences, but the luxuries of life, which, in some degree, are necessary to alleviate the lassitude and inactivity the climate produces.

Lady Louisa.

I have not the least doubt, I should prefer the torrid to the frigid zone.

Mentoria.

Be not hasty in your determination; always hear both sides of the question, before you determine in favour of either. I am inclined to think, I should stand neuter; though I do not mean to bias your judgment.

Lady Mary.

Now, my dear Mentoria, point out the advantages of the frigid zone: the prospect appears so very dreary, I cannot imagine in what they consist.

Mentoria.

The coldness of the climate renders the soil unfruitful, in all vegetable productions. To compensate

compensate for this deficiency, those countries abound with animals of different kinds, which afford food and raiment; also fish of various sorts. The inhabitants are very industrious, and can endure infinite fatigue: all the comforts they enjoy, are produced by their own labour: neither can there be a stronger incitement to industry, than the reflection, that our sustenance depends upon the full exertion of our abilities. A sincere endeavour to produce this effect, is ever blessed with means, by the kind hand of Providence. In many of the remote countries of the frozen zone, there are no means of obtaining food, but by hunting or fishing, as there is no resource of a market. Neither can the inhabitants say, "To-day I will have veal for dinner; I am tired of mutton;" as Providence, not choice, furnishes their repast, and which, from the share of health and strength they enjoy, is often better relished than all the Asiatic dainties. They are usually long-lived, which may be accounted for thus: as heat causes an universal lassitude, by relaxing the nervous system, and consequently shortens the duration of life; so it follows, as a natural consequence, that cold braces up and invigorates the human frame, which

which produces many instances of longevity. Every situation in life has its peculiar advantages. As every blessing we enjoy, loses part of its value by possession, I am clearly of opinion, those circumstances, which appear to us in a formidable light, are not esteemed such great evils by those accustomed to their pressure. There is a passage in Pope's Essay on Man, which, by taking the liberty to alter one word, is applicable to my present purpose.

But where th' extreme of cold was ne'er agreed,
Ask where's the North? At York, 'tis on the
Tweed;

In Scotland at the Orcades, and there
At Greenland, Zembla, or the Lord knows where.
No creature owns it in the first degree,
But thinks his neighbour further gone than he:
Ev'n those, who dwell beneath its very zone,
Or never feel the rage, or never own.
What happier natures shrink at with affright,
The hard inhabitant contends is right.

Lady *Louisa*.

I still think, I had rather live where there
was great plenty and elegance, than be subject
to such difficulties.

Mentoria.

Mentoria.

What, my dear, would it avail you, to have your table furnished with all the luxuries the East could afford, if you were not blessed with an appetite to relish them? Your situation would be similar to that of Tantalus, who had always delicious fruits and water before his eyes, though he was never able to taste either; which was inflicted on him, as an heavy punishment.

Lady Mary.

But if we lived in those countries, we should have slaves to carry us about on palanquins, with canopies over our heads, and attendants to fan us.

Mentoria.

I have so good an opinion of your Ladyship's disposition, as to think, when you viewed this circumstance in a serious light, it would give you great pain; as nothing can more deeply affect an ingenuous mind, than seeing a fellow-creature reduced to the necessity of suffering any hardships, we cannot endure ourselves; which is greatly increased, when we reflect, our convenience is the cause. I can scarcely imagine, the human heart can be so callous in the feelings of philanthropy, as ever
wholly

wholly to be divested of pity and compassion;
and am inclined to believe, for the honour of
the human species, they are often stifled,
though but seldom extinguished.

The human mind, with sense of pity wrought,
Yields to the force of sympathetic thought;
Form'd of a texture, which no eye can trace,
Folly, and guilt, its brightness does efface:
Apt to receive impressions, nor retain
Those, which review'd, cause fear and endless
pain.

As notes of music, bending to the touch,
Produce harsh discord, if they're press'd too
much;

Yet, if the whole in full accordance join,
The mental harmony is then divine!

Lady Louisa.

I am quite of your opinion, my dear Mentoria, and think I should never take long journeys, if they were performed by such painful means; as every step the slaves took, would make me uneasy.

Mentoria.

We shall find in this, as in most other instances of life, the less we depend on others,
the

the better the different functions of our state are performed. ^{is} Providence has endued us with the faculties of motion, and granted us organs suited to the purpose; the full exertion of which is more agreeable and conducive to health, than any vehicle luxury or art can invent; though, under many circumstances, they are extremely useful.

Lady Mary.

What state then, my good Mentoria, do you prefer?

Mentoria.

Without doubt, that which is exempt from the rigor of the frigid zone, and the sultry heat of the torrid. Such is the happy predicament, in which we stand; as our country is under the temperate zone. The agreeable vicissitude of the seasons, and the abundance we enjoy, should inspire our hearts with gratitude, for such inestimable blessings, denied to so great a part of the human species. Our land is not scorched, by being situated under the meridian of the sun; neither are our seas frozen, by being deprived of his cheering power: his radiant beams are dispensed in such just proportion to our wants, as to produce all the comforts and conveniences of life. There is another
peculiar

peculiar advantage in our situation, that our manners preserve the medium between the Northern barbarity, and Eastern luxury; and form a system of politeness and urbanity, which is ever acceptable and engaging.

Lady Louisa.

I now rejoice in the comforts of our situation, and should be sorry to change it for any other. But is this all, my dear Mentoria, you intend to say on the subject?

Mentoria.

I shall endeavour to form a metaphorical allusion of the degree of comparison the different climates will bear to the different states of life; and shall begin this enquiry, by comparing grandeur and power to the torrid zone; not only from the luxury which attends it, but also because they oppress those, who feel their weight. The slaves, who are licensed in those countries, are like the venal flatterers, who are subservient to those in power, and whose freedom is bartered for gain.

Lady Mary.

What is the next point, you intend to explain?

Mentoria.

The similitude between the temperate zones, and the state of life usually called competency: they

they both afford every requisite necessary to our happiness. Riches, as well as heat, in the superlative degree, are in general oppressive to the possessors, and rather cause pain than pleasure, from their attendant consequences. On the contrary, moderate wealth, like a temperate clime, makes every object smile with peace and plenty.

Lady Louisa.

My dear Mentoria, are you not now drawing a comparison, from the state of life we are in?

Mentoria.

Yes, my dear; and am going to trace that, from which you are happily exempt. The traits are so strong, which form the likeness of poverty to the frigid zone, they are easily delineated. It is needless to inform you, this state deprives all, who are under its dominion, of every source of sustenance or support, but what is obtained by the efforts of their own industry. As the seas of the frigid zone are sometimes frozen, and refuse their produce to the inhabitants of those parts; so too often is the human heart petrified, and incapable of receiving the soft impression of pity; and the tears congealed, which ought to flow in com-
miseration

miseration of the indigent. Health and strength are annexed to both these states, which arise from the same cause, a total exemption from inactivity and luxury.

Lady Mary.

But are these people happy, my dear Mentoria?

Mentoria.

The beautiful lines, I have just recited from Pope, clearly indicate, the inhabitants of the frigid zone are not dissatisfied with their situation. It appears equally clear to me, that poverty is not incompatible with happiness; as by industry all the necessaries of life may be acquired, which are all our state requires. These, with temperance and health, place those who possess them above contempt, though they are entitled to our compassion and assistance.

Lady Louisa.

What a striking resemblance you have pointed out, which I should never have thought of! What effect ought it to have on my mind?

Mentoria.

If you apply it to your own situation, you are to infer from thence, that the state which is allotted you, in respect of climate and station
of

of life, is a peculiar blessing. It will also teach you not to envy the powerful, nor despise the indigent; the former being only entitled to respect, the latter to your best endeavours to relieve their distresses; as the true use of riches consists in supplying our own wants, which should ever be confined within the rules of temperance and frugality, that we may be enabled to provide for the necessities of others.



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DIALOGUE VI.

SATURDAY.

On History; with the Life of Romulus and Remus.

Mentoria.

I Propose, my dears, this morning, to give you a short dissertation on history; and shall endeavour to convince you of the necessity of your making it your peculiar study.

Lady Mary.

Are there not many different kinds of history, my dear Mentoria?

Mentoria.

Undoubtedly my dear. I will proceed to consider them under their different classes, and shall begin with the scriptures, which are often called *sacred history*; to which I shall oppose the heathen mythology, which contains a de-

scription of the deities worshipped by the heathens; from hence called *profane history*.

Lady *Louisa*.

What history do you think is most proper for us to read?

Mentoria.

I shall pursue the discussion of each particular branch, and then determine my choice. *Natural history* delineates all the productions of nature, and enables us to form an idea of all her works: such as animals, fishes, birds, insects, trees, plants, ores, fossils, &c. &c.

Biography, or the history of famous persons, is very entertaining, and also instructive, as it inspires the mind with a desire to attain those qualities, which have so eminently distinguished others. The history of your own country teaches you the progress of arts, manufactures, and commerce, and clearly proves the advantages which are derived from a well regulated state; is also informs you of the various means which were used to form the system of the British constitution. The persecution and arbitrary measures authorized in former times, should excite in us joy and gratitude, for the lenity and freedom of the present government. Ancient history, (particularly the Roman) enlarges the understanding, and quali-

f i s

fies us for the perusal of polite authors, as it is necessary to be acquainted with the manners of the ancients, in order to form a competent knowledge of those of the moderns.

Lord George.

Was not Rome once a very famous place; and inhabited by persons of extraordinary sense and learning?

Mentoria.

It was the seat of Empire, as well as of polite arts and literature, notwithstanding which, the luxury and effeminacy that prevailed, subverted the government; and at present it is only famed, by being the Papal See, and consequently the residence of the Pope, Cardinals, &c. and also for the magnificence of the buildings, fine paintings, rains, &c.

Lady Mary.

Now, my good Mentoria, will you tell us which history is the most proper for us to read?

Mentoria.

My dear Lady Mary, in order to silence your importunate entreaties, I must declare it is absolutely necessary you should be well read in all. At present, I wish sacred and natural history to be the chief objects of your attention; as they both tend to increase your love

and admiration of the deity. When you are a little farther advanced in life, I shall recommend to your perusal the history of England, and also that of the Romans. In this course of reading, you will meet with a number of entertaining anecdotes and surprizing circumstances, which attended the lives of famous persons, whom you now only know by name. History will introduce you to a farther acquaintance with them, and enable you very soon to give as clear an account of Cato, Demosthenes, Mark Antony, &c. as if you were personally acquainted with them.

Lady Mary.

From whence did Rome derive its name?

Mentoria.

From Romulus, who built the city. I should imagine it would be agreeable to you, to know some particulars of the founder of so great a capital. I shall therefore give you a sketch of his character, and that of his brother Remus, as they are drawn by Plutarch the famous biographer.

Lady Louisa.

Is his life entertaining, my dear Mentoria? if it be, I shall attend to it with pleasure.

Mentoria.

I think it is remarkably so, my dear Lady Louisa, which made me choose to recite it.

The

The Life of ROMULUS and REMUS.

THE kings of Alba being lineally descended from Æneas, the succession devolved upon Numitor and Amulius, who were brothers. In order amicably to settle the division of the empire, the treasures, which were brought from Troy, were placed on one side, and the kingdom on the other. Numitor chose the kingdom, consequently the riches were the possession of his brother. Amulius soon dethroned Numitor; and, fearing his daughter might have children, who would lay claim to the crown, he made her a priestess of the goddess Vesta, to prevent her entering into the marriage state, as none but single women were admitted of that order. This lady, whose name was Rhea Sylvia, being not suited to the office appointed her, was soon discovered to be pregnant, for which she was sentenced to undergo a severe punishment; but Antho, the daughter of Amulius, espoused her cause, and prevailed on her father to change her punishment into confinement and solitude. In this retirement, she was delivered of two sons, remarkable for their size and beauty,

which created jealousy in the tyrant's breast, and induced him to form plans for their destruction: to effect which, he commanded a servant to destroy them. The person who undertook to perform this horrid deed, put the children into a trough, and carried them to the banks of a river, with intent to cast them in; but the water being unusually rough and high, the fear of endangering his own safety, induced him to leave the trough on the shore, and make a precipitate retreat. The high tide of the river bore it up, and conveyed it to an even shore, near which there stood a fig tree, which sheltered the children from the rays of the sun: it is also said a she wolf suckled them, and a wood-pecker brought them their daily food. They were discovered in this situation by Faustulus, herdsman to Amulius, who brought them to his wife, from whom they received every attention their helpless state required. As they advanced in life, they were distinguished by their strength, courage, and greatness of soul. Remus was of an active turn of mind, and of an enterprising spirit. Romulus was of a different disposition, inclined to study, and naturally prudent.

They signalized themselves in a quarrel which happened between the herdsmen of Numitor
and

and Amulius, which manifested their merit, and divulged the mystery of their birth. Romulus and Remus opposed the herdsmen of Numitor, as they thought them to be the aggressors. They also associated with those persons, who, either from their poverty or being in the bonds of slavery, wished to effect a revolution in the state.

Lord George.

Were they not very much to blame, to keep company with such persons, and take part against their grand-father?

Mentoria.

Nothing can excuse the former, except the supposition, that they groaned under oppression, and naturally wished to obtain their freedom, or some other advantage equally necessary to their happiness: the latter charge is wholly extenuated, by their total ignorance of their parentage and noble descent. To pursue the history, every thing was ripe for a rebellion; when Remus was taken prisoner, whilst Romulus was sacrificing to the gods. He was carried before his grand-father Numitor, and charged with several crimes, who referred him to Amulius to receive sentence. After having demanded satisfaction for the injuries his servants had sustained, Amulius sent him to Numitor, to receive sentence adequate to the of-

fence he was guilty of. Numitor, so far from inflicting one that was severe, ordered him to his own house; as during the examination, he perceived something in his countenance which deeply engaged his attention, and induced him to make enquiries respecting his descent and way of life. To which Remus returned this spirited reply:

“Your justice in examining, before you
“condemn, deserves, on my part, the return
“of truth and sincerity. I am a stranger to
“my family and descent; I have but one
“twin brother; we have ever been considered
“as the sons of a shepherd; but since our ac-
“cusation, it has been rumoured we are of
“noble extraction. Our birth is mysterious;
“our support in infancy miraculous; as a she-
“wolf suckled us, and a wood-pecker supplied
“us with nourishment, whilst we lay in a neg-
“lected and helpless state by a river’s side.
“The trough is preserved which contained us,
“and the inscription still legible: these, per-
“haps, may be discovered by our unhappy
“parents, when we are no more!”

Numitor was much affected with this speech, the young man’s appearance, and the substance of his narration, agreeing with the time his daughter’s children were born, induced him to

hope

hope they were her descendants: to confirm which, he had an interview with his daughter, who was then in prison. Faustus, the herdsman, thought in this critical juncture of affairs, any further delay would be dangerous, so he informed Romulus of his real birth, and resolved to produce the trough, as a testimony of the real parentage of these young men.

Lady Mary.

You cannot imagine, my dear Mentoria, how much I feel myself interested in their history!

Mentoria.

Faustus was at length determined to carry the trough to Numitor; his apparent haste and anxiety, betrayed the importance of his errand. Unfortunately, one of the guards who observed his eagerness, and was present when the children were left on the shore, and recollecting the trough and inscription, immediately informed Amulius of his discovery; who behaved as persons usually do that are enraged, and in fear of being detected in a bad action. He dispatched a messenger to Numitor, to enquire if his daughter's children were alive, who, finding Numitor inclined to acknowledge the young men to be his grand-children, advised him to assert his right, and offered to

assist him in so arduous an undertaking. Things were now brought to a crisis. Romulus appearing at the head of a numerous band of his companions; the citizens from the hate they bore to the usurper, readily revolted. Thus by commanding a powerful army, and Remus previously having gained the populace over to his cause, Amulius was dethroned, and being unable to make any resistance or to escape, he was seized and put to death. The two brothers were now in possession of the kingdom of Alba, but did not choose to reside there, without holding the reins of government, which they could not do consistent with equity, as it was their grand-father's inheritance. After having resigned the kingdom to Numitor, and with filial piety discharged their duty to their mother, they formed a plan of living together, and determined to build a city amongst the Hills, where they received their education. In order to increase the number of their subjects, they caused their territories to be a refuge for all who had violated the laws of their own country, and dreaded the punishment due to their crimes. These considerations soon placed our heroes at the head of a numerous army. They now differed respecting the place where the city was to be built.

built. Romulus wished it to be built where he had made a square of houses, which he called Rome; but Remus thought the Aventine Mount a more eligible situation: at length they agreed it should be determined by Augury, or the flight of birds. The divination proved in favour of Romulus, as twelve vultures appeared to him, whilst Remus saw but half the number.

Lady *Louisa*.

How very foolish it was to let the flight of birds determine such an important affair!

Mentoria.

Your astonishment, my dear, will cease, when you reflect, that the Pagans were guided in all their actions, by means equally delusive: such as the *oracles*, which were sentiments delivered in so mysterious and ingenious a manner, as to bear any construction that suited their purpose; or by the flight of birds, blood of animals, &c. some of which were thought a good omen, and others portentous of some heavy calamity. There cannot possibly be a stronger argument, to prove that every creature is inclined to worship, and seek the aid of a superior power, as in those early times, when the gospel was not revealed, and the greatest part of the world were totally ignorant of the existence

istence and power of the great Creator, they sought redress from, and implored the assistance of the sun, moon, stars, birds, beasts, statues, &c. to which they ascribed the power of relieving their necessities. We must now return to Romulus, who, as soon as he had gained his point, began to put his plan in execution. Remus affected to despise his brother's attempt to fortify the city, and, whilst the foundation of the wall was digging, with a degree of insolent contempt, leaped over the ditch; which enraged Romulus so much, it is said he killed him on the spot. Faustus, the good old herdsman, was also slain in the scuffle. Romulus buried his brother, and old friend, with great pomp and solemnity, and then proceeded to build the city.

Lady Mary.

What an act of cruelty it was in Romulus to murder his brother, for so slight an offence, which at most deserved but a trifling reprimand! I think he must be very unhappy afterwards.

Mentoria.

I dare say it gave him but little, or perhaps no uneasiness; as in those days it was not thought such a heinous offence for any person to take away either their own life, or that of another, there being then no distinction between rashness
and

and courage; and such acts of violence and cruelty, were more frequently applauded than condemned.

Lord George.

I want very much to hear how he went on with the city.

Mentoria.

Previous to laying the foundation, he sent to Tuscany for workmen to direct the forms and ceremonies due on such occasions. They began by digging a trench round the building, designed for the court of justice; into which they threw the first fruits of all valuable productions both of art and nature. Each of them also, took a small portion of the soil of the country from whence they came, and cast it in promiscuously. This trench was to form the centre of the city, round which they were to mark the distance for the extent.

The founder, seated on a brazen plough-share, yoked together a bull and a cow, and turned a deep furrow round the bounds of the city. He lifted up the plough, where he intended to place the gates, so that they were a free passage for things mystical or profane; notwithstanding every other part was held sacred. This city was begun on the 21st of April*.

* About 751 years before the birth of Christ.

The

The anniversary of this memorable event was a high festival amongst the Romans. The city being complete, all who were able to bear arms, were enrolled into companies of three thousand foot guards, and three hundred horse, which were called legions, as they were selected from the rest of the people. He also chose an hundred men of distinguished abilities for his counsellors, whom he called patricians, and the whole body the senate. To mark the different ranks of life, he filed the senate the patrons, and the populace or plebeians clients. The next point to be considered was, the population of the city, as without women it would soon have been desolate. To effect this purpose, he had recourse to the following stratagem: he caused it to be proclaimed, that the altar of a god had been discovered under ground, and appointed a day for a solemn sacrifice and public games. Most of the inhabitants, with their wives and daughters, came from the neighbouring villages to the celebration of this festival. Romulus was clad in purple, and seated in the midst of his nobles. It was previously agreed to seize all the young women, when Romulus gave the sign or token, by rising from his seat, and throwing his robe over his body. As soon as he gave the signal, they drew their swords, and,

and, with a loud shout, seized the daughters of the Sabines, to the number of about 683. The Sabines were a numerous and warlike people, residing chiefly in small unfortified villages. This injured nation sent ambassadors to Romulus, to insist on their daughters being restored; and also to propose forming an alliance on more equitable terms. Romulus rejected this proposition, though he wished to preserve their friendship.

Lady Louisa.

My dear Mentoria, I sincerely pity the Sabine women for being taken from their friends: how hard I should think it to be torn from my parents! Was it not very cruel of Romulus to seize them?

Mentoria.

Nothing can be urged in his defence, except the exigence of his situation. There are some instances, in which acts of oppression are sheltered under the term of state policy, and stand exempt from reproach, on account of the good effects they produce.

Lord George.

I am surprized the Sabines did not resist the power of Romulus.

Mentoria.

We are now come to the part of the history,

ry, which informs us, Acron the king of the Ceninenfians attacked this new fettlement. Romulus was not prepared to defend himself, by any other means than fingle combat, in which he came off victorious, he killed Acron, routed his army, and took poffeffion of the capital. This event did not difcourage the Sabines from profecuting their intended war; accordingly they chofe Tatius for their general, who marched againft Rome. The citadel was well fortified, and commanded by Tarpeius, a man of great valour; his daughter, Tarpeia, infligated by love or avarice, betrayed one of the gates to the Sabines: fhe claimed as her reward, all they wore on their left arms, which confifted of a golden bracelet and buckler. This traitrefs met with the punifhment her crime deferved, for as Tatius, the general of the Sabines threw his buckler at her, the whole army following his example, fhe was crufted to death.

The battle was carried on a long time, with great slaughter on both fides; but was interrupted by the interpoftion of the Sabine women, who were fettled in Rome. Their frantic cries, when they beheld the dead bodies of their husbands and fathers, caufed a fcene of general confufion. The two armies fell back to
hear

hear their complaints and expostulations, which were to this effect: "What crimes have we committed to deserve such repeated and unmerited misfortunes. We were made wives by compulsion, though duty has at length induced us to love those whom at first we regarded with horror and detestation. Do not, from the idea of redressing the grievances we have sustained, separate us from our husbands and children; and notwithstanding you may have other motives for engaging in this war, we hope, for our sakes, you will cease hostilities. We behold our kindred every where, resign us therefore to our husbands and children, as the being separated from them would be the worst captivity we could experience!

Their entreaties had the desired effect, and produced a treaty of peace. This act of heroism, caused an edict to be made in favour of the Roman women, to exempt them from all labour but spinning. The Romans and Sabines were to inhabit the city on equal terms. It was agreed the city should be called Rome, from Romulus; but the inhabitants Quirites, from Cures, the capital of the Sabines. The power of the two kings was to be equal.

This

This form of government continued in an uninterrupted state of harmony for five years, but was disturbed by the following circumstance : the friends of Tatius happened to meet some ambassadors who were going to Rome, whom they robbed and murdered. Romulus was of opinion this crime deserved immediate punishment, but his colleague opposed this measure, as he feared the being deprived of those men would weaken his power. The relations of the ambassadors, sought an opportunity to be revenged on Tatius, and effected their purpose by seizing him at a village near Rome, where, with Romulus, he was offering a sacrifice, and he fell a victim to their resentment.

The Veientes declared war against Romulus, by remanding the city of Fidenæ, which he had taken ; but their army was defeated, and a truce made for an hundred years. This was the last war in which Romulus engaged.

Lord George.

The affairs of Romulus now seem to bear a very favourable aspect, as he appears to have subdued his enemies, and to be in possession of the kingdom without a rival.

Mentoria.

These flattering views proved but of a very
short

short duration; and vanished almost as soon as they appeared. Elated with his prosperity, he grew imperious and assuming. The complacency and condescension which rendered him so amiable, were now obscured by pride and petulance. He clothed himself in a purple vest, over which he wore a loose robe with a purple border; and received those who were admitted into his presence on a chair of state, with every appendage of magnificence and royalty.

He was attended wherever he went, by several lictors, or executioners, each bearing an ax bound up with a bundle of rods, to denote their power to punish. This conduct of Romulus met with universal disapprobation. The senators were more particularly his enemies, on account of the little attention he paid to their counsels. In order to revenge the insults they sustained, they formed a plan to seize him, whilst he was holding an assembly in the temple of Vulcan; which they effected by cutting him in pieces, and each taking away part of his body, they caused it to be proclaimed, he was carried up to heaven in a whirlwind. This account did not gain belief; consequently the people

people were inclined to make further enquiries, respecting the death of their king.

Whilst this sedition was in its infancy, Julius Proculus, a man of unblemished character, solemnly deposed, that as he was travelling on the road, he met Romulus arrayed in bright armour, with a divine aspect; who thus addressed him:

“ It has been ordained by the gods, O Proculus, that I should return to heaven, from whence I came, after having built a city, and formed a system of government, which will be an example for future ages. Inform the Romans, that, by the exercise of manly virtues, they will attain the height of human glory; and also that their king, transformed into the god Quirinus, will grant all their petitions. Fare ye well.”

Lady Mary.

Did the Romans believe this pretended vision?

Mentoria.

It gained universal belief; which is not to be wondered at in such a superstitious age: they also worshipped him, as their tutelar Deity. Thus did Romulus fall, in the fifty-fourth year of
of

of his age, and thirty-eighth of his reign; a striking instance, how very few are proof against the allurements of magnificence, and a series of prosperity. He was punctual in the performance of all religious rites and ceremonies, and generally carried the crooked rod in his hand, used by magicians to mark out the heavens. He also pretended to be deeply skilled in the occult sciences. His wisdom was manifested by the laws he instituted, amongst which he specified no punishment for parricide; as he supposed, no human creature could be so abandoned, as to commit it: nor was there ever an instance known, till six hundred years after. The unfavourable circumstances, which attended the final scene of the life of Romulus, were the natural consequence of his arbitrary proceedings, and his unbounded passion for power and glory; desires, which, if they are not restrained by prudence and humanity, are ever destructive in their consequence.

Lady Louisa.

I am sorry, dear Mentoria, this entertaining History is finished: I like it almost as well as the Fairy Tales.

Mentori.

I am glad you are pleased with it, my dear Lady Louisa: you must treat part of it as a fable,

fable, and only take the facts which are recited, in a literal sense.

Lady Mary.

Pray, my dear Madam, what is *parricide*, I suppose it is a very great crime.

Mentoria.

It is the most heinous offence that can be committed, as it consists of the murder of a father. Matricide is the term to express the murder of a mother; fratricide of a brother; regicide of a king; homicide of a man; suicide of one's self: hence it is the Jews are called *decides*, because they murdered Christ, who was the son of God.

Lady Louisa.

What is the Tutelar Deity, my good Mentoria?

Mentoria.

The term *tutelar* signifies a guardian or protector. Minors who are under the direction of a guardian or tutor, are said to be in a state of tutelage; there are tutelar saints as well as deities. St. George is styled the Saint of England, St. Andrew of Scotland, St. Patrick of Ireland, St. David of Wales, St. Lewis of France, St. Mark of Venice, besides many others. These were all persons who distinguished

tinguished themselves by some heroic actions. The countries which derived the advantage, desirous of rendering their memory immortal, canonized them as saints; and appointed an annual festival to commemorate their heroes, and celebrate them as the guardians and protectors of their country.



DATA FILE

DIALOGUE VII.

SUNDAY.

On the Church-Service, with an
Explanation of the Parable of
Nathan and David.

Mentoria.

LADIES, as *Sunday* is a day set apart for the worship of God, I shall prohibit all trifling pursuits, and endeavour to employ your time suitable to so laudable a purpose.

Lady Mary.

I should be sorry to act contrary to the express commands of God, which enjoin us to keep holy the Sabbath Day, and to abstain from all kinds of work. But I wonder why we are

forbidden to pursue our business on this day; as I cannot see any reason, it should be offensive to God, for us to do our duty by working, &c.

Mentoria.

To give you a clear idea of the institution of the Sabbath, it is necessary to inform you, the division of time, usually called a *week*, is a type or symbol of the creation of the world, which is clearly explained in the fourth commandment: "For in six days the Lord made
" heaven and earth, the sea, and all that in
" them is; and rested the seventh day: where-
" fore the Lord blessed the seventh day, and
" hallowed it." In like manner, we perform all that we have to do, in six days, and rest the seventh, in commemoration of the manifold blessings we receive at the hand of God. A cessation from labour is necessary to effect this great purpose; as the avocations and pursuits, in which the greatest part of the human species are employed, would not allow them sufficient time for serious consideration, nor permit them regularly to attend divine service.

Lady Louisa.

I always thought, my good Mentoria, Sunday was a day of rejoicing; as every body seems happy and cheerful. For my own part,
I like

I like it better than any day in the week, because I get no task: yet you say, if people worked, it would not allow time for serious consideration. I cannot see the reason for being serious on a holiday.

Mentoria.

In this you are mistaken, my dear Lady Louisa; as the term *holiday*, like many others, is strangely degenerated, and perverted from the original intention. A moment's reflection will convince you of your error; as there requires no other conviction, but to divide the word into *holy-day*, which implies a day that is to be kept sacred. Cheerfulness is not prohibited: those, who conscientiously discharge their duty, generally possess this quality in the greatest degree. It is the natural consequence of having acted agreeable to the rules of right reason; as the self-approbation, which arises from the performance of religious rites, inspires the mind with that temper and conduct, which alone deserve the name of Cheerfulness. Whilst, on the contrary, Levity (which the weak and inconsiderate mistake for Mirth) is incompatible with the duty we owe to our Creator; as it obscures the only resemblance we can possibly bear to him, which consists in

the full exertion of our reason, and mental faculties,

Lady Mary.

I am quite ashamed, when I reflect how inattentive I have been on these occasions, which I now find, required serious attention; but am resolved, nothing shall induce me to commit the same fault in future.

Mentoria.

That is all which will be required of you. The frailty of our nature subjects us to frequent mistakes, which are only sinful, when we do not recover as fast as possible from our errors, nor avoid the repetition of those, which either our own experience, or the kind admonitions of our friends, have pointed out to us.

Lady Louisa.

I am sure, my dear Mentoria, I shall never again be careless and inattentive at church; but shall regard my duty, and seriously listen to the minister, who performs the service.

Mentoria.

This attention, my dear Lady Louisa, is absolutely necessary. To convince you nothing can excuse the neglect of it, I shall inform you, the Church-Service is divided into two parts, *supplication* and *thanksgiving*. Supplication

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is the request and humble petitions offered at the Throne of Grace, for the continuation or increase of the comforts or conveniences of life; or to be relieved from any trouble, which oppresses us, such as sickness, want, &c. There requires but little to be said, in order to convince you, this part of the Service demands fervor and humility, to make our petitions acceptable. The absurdity of a contrary conduct cannot be more clearly evinced, than by supposing, you wished to procure any temporal advantage, to effect which you obtained an audience of an earthly potentate; it will not admit of a doubt, but that, when you were conducted into his presence, you would be inspired with a degree of awe, which would prevent any unguarded look or expression falling from you: neither, when you began to plead your cause, would you suffer your dress, or any external object, to divert your attention from the great end you had in view. If this conduct is due to the creature, how can we raise our ideas sufficiently high, to perform acceptable service to the Creator? Our infinite obligations cannot be exceeded, but by his mercy, which is extended over all his works; for it is in Him alone, we live, move, and have our being.

Lady Mary.

I am so thoroughly convinced of the necessity of paying the greatest attention to every thing which is sacred, that it will not only influence my conduct in the public worship of God, but also, for the future, make me more devout when I say my prayers in private. I will not, my dear Mentoria, interrupt you any longer; as I am impatient to hear your definition of thanksgiving.

Mentoria.

Thanksgiving is the grateful sense we feel, for any favour or benefit received; which is testified by acknowledging, in the most public and solemn manner, the obligations we owe to our benefactors. Those, which we receive at the hand of God, bear no degree of comparison, with any that can be derived from a prince or ruler of the earth: yet, if any temporal advantage requires our making a suitable return to the person who bestowed the gift, what tribute can we pay to the Giver of all spiritual gifts? He requires no oblations, but what should voluntarily proceed from a good heart; such as an uniform obedience to his holy laws, and faith in his promises. We should be zealous in the discharge of this part of our duty.

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There requires no other incitement to make us so, but a just estimate of the invaluable blessings of our creation, preservation, and redemption; a due sense of which will inspire us, to enter into his courts with joy, and sing praises unto his holy name.

Lady Mary.

My dear Mentoria, you have given me such a clear idea of my religious duty, I cannot possibly ever neglect the performance of it. I remember, you once promised to explain some of the parables to me: if it be agreeable, I shall now attend to you with pleasure.

Mentoria.

To proceed in due order, I must begin by informing you of the nature of *parables*, and why our blessed Saviour chose this mode of instruction, to enlighten the minds of his disciples, in preference to any other. A parable is a figurative composition; and when it is not spoken by an inspired person, nor found in holy writ, it bears a near resemblance to apologue or fable; as the conviction both produce arises from the moral inferences drawn from them: which, by the indirect application they make to the heart, have induced many persons of inflexible dispositions, to yield evi-

dence against themselves. This undoubtedly was the cause of our Saviour's delivering his instructions in parables, as they not only engaged the attention, but surmounted the cavils and obstinacy of the Jews; which could have been effected by no other means. If he meant to convince a sinner of the heinousness of his offence, and to lead him into the right path, by the light of the gospel; he represented in such glaring colours, the particular instance in which he erred, that the deep sense the offender had of his own guilt, obliged him instantly to forsake it, or he remained self-condemned. As there appeared nothing personal in the attack, he might at first be enraged against the perpetrators of the very crimes he was guilty of himself: a remarkable instance of which we find in David, when Nathan was sent to reprove him for killing Uriah, that he might marry his wife Bathsheba.

Lady Louisa.

That is one of the stories I am particularly fond of: so I hope, my dear Mentoria, you will explain it first.

Lady Mary.

Lady Louisa, I approve your choice so much, that, if you had not made the request, I should have done it myself.

Mentoria.

Mentoria.

I will comply with your request, though it in some measure, obliges me to go in a different track from what I intended; as I proposed selecting one of our Saviour's parables, as best suited to inform you of the nature of his ministry. Notwithstanding which, that delivered by the prophet Nathan (as he was an inspired writer) deserves your praise and attention.

Lady Louisa.

Pray, *Mentoria*, what is a *Prophet*?

Mentoria.

A Prophet was a person of exemplary conduct and holiness of life, inspired by God with the power of foretelling events.

Lord George.

Are there any Prophets now? I think I know no body, who can say what will happen.

Mentoria.

It is not now necessary there should be any Prophets, as God by those, and other means, has so clearly revealed his will, that even the most ignorant do not so much err from not knowing their duty, as because they have not resolution to practise it. In the early ages of the world, and before Christianity was so firmly established, prophecies and miracles were indispensably

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necessary,

necessary, to remove the errors of the Pagans, and the obstinacy of the Jews. As every circumstance they foretold, agreed in unity of time and place, and came to pass exactly as they were predicted; there could be no doubt of their divine origin, as such wonderful things could not be effected or produced by any human means.

Lady Mary.

What are the *Pagans*, my good *Mentoria*?

Mentoria.

The Pagans are those people, whom you have perhaps heard or read of, by the name of Heathens; who worshipped idols, which consisted of men, birds, beasts, &c. I shall say but little on this subject, as you will find it clearly explained in the Pantheon.

Lord George.

I hope, my good *Mentoria*, you will now begin the Parable; as I am very fond of allegorical writings.

Mentoria.

I shall first recite the Parable, explain each particular branch of it, and then endeavour to find how we can apply it to ourselves.

THE PARABLE.

“ And the Lord sent Nathan to David, and
“ he came and said unto him, There were

“ two

“ two men in one city, the one rich, and
“ the other poor. The rich man had exceed-
“ ing many flocks and herds; but the poor man
“ had nothing, save one little ewe-lamb, which
“ he had bought and nourished up; and it grew
“ together with him, and with his children:
“ it did eat of his own meat, and drank of his
“ own cup, and was unto him as a daughter.
“ And there came a traveller unto the rich
“ man, and he spared to take of his own flock,
“ and of his own herd, to dress for the way-
“ faring man, that was come unto him; but
“ took the poor man’s lamb, and dressed it
“ for the man that was come unto him. And
“ David’s anger was greatly kindled against
“ the man, and he said to Nathan, As the
“ Lord liveth, the man that hath done this
“ thing shall surely die: and he shall restore
“ the lamb four-fold, because he did this thing,
“ and because he had no pity. And Nathan
“ said unto David, Thou art the man!”

Lady Louisa.

It is scarcely possible to imagine, as David was so much enraged against the person, who he thought had committed such an act of oppression, that he could ever have been guilty of a similar offence,

Mentoria.

Mentoria.

Yet it is evident he was, and with many circumstances, which aggravate, and make his transgression appear in a more heinous light, than that described by the Prophet. We will now consider the first sentence of the Parable, which strongly marks the different spheres of life, in which David and Uriah acted. "There were two men in one city; the one rich, and the other poor." David was the greatest king of the East, and Uriah comparatively poor; as he was only one of the king's officers. "The rich man had many flocks and herds." This passage alluded to the many wives that David had, as in those days persons of all conditions of life were permitted to have as many as they could maintain. The great number which David had, do not appear to have been imputed to him as a fault, but considered as a necessary appendage to his royalty. The disproportion of their outward condition is beautifully preserved throughout the whole metaphor, and is emphatically expressed in the following words: "But the poor man had nothing, save one little ewe-lamb, which he had bought and nourished up; and it grew up together with him, and with his children:

"it

“ it did eat of his own meat, and drank of
 “ his cup, and was unto him as a daughter.”
 By this we find, Uriah had but one wife; and
 by her being compared to a lamb, we are nat-
 urally led to suppose, she was a woman of an
 amiable disposition, and exemplary conduct;
 as a lamb is an emblem of innocence. We
 are also to imagine, from the kind treatment
 bestowed on the lamb, that Uriah was a tender
 husband, and afforded Bathsheba all the com-
 forts and conveniences, his situation enabled
 him to procure. We are now come to the
 passage, which describes a traveller coming
 unto David, in these words: “ And there
 “ came a traveller unto the rich man, and he
 “ spared to take of his own flock, to dress for
 “ the way-faring man that was come unto him;
 “ but took the poor man’s lamb, and dressed
 “ it for the man that was come unto him.”
 These allusions undoubtedly imply the inordinate
 and unruly passion, which induced David to
 commit such an atrocious crime. The being
 described as a traveller, clearly indicates it took
 him by surprize, and would remain his guest
 but a short time. The entertainment, he is
 supposed to have provided for him, is strongly
 expressed by the sparing his own herds, and
 taking

taking the poor man's lamb; which was literally the neglecting his own wives, and setting his affections on Bath-sheba, the wife of Uriah. We are now to examine the final, and most interesting part of the story; which is the strongest instance, that can possibly be produced, of the frailty of human nature. "And
" David's anger was greatly kindled against
" the man, and he said to Nathan, As the
" Lord liveth, the man, that has done this
" thing, shall surely die; and he shall restore
" the lamb four-fold, because he did this
" thing, and because he had no pity." When David pronounced this sentence, he little suspected, it contained his own condemnation. If he had formed the slightest suspicion, the offence bore any similitude to his own condition, he would have found some favourable circumstance to extenuate the fault, and, consequently, to mitigate the punishment. The accusation came in such an oblique direction, there was no possibility of his warding off the blow. The detestation he felt for the offender is clearly proved, by the severity of the sentence he inflicted; as four-fold restitution in kind was all the law required. Yet, in this instance, David thought it was not sufficient atonement,
and

and commanded the culprit to die. The reason he alleged was this, "Because he had no pity." Alas! where were his compassion and tender feelings flown, when he broke through every obligation, moral and divine, in destroying Uriah, that he might rival him in the affections of his wife! The truth was this; his passions had induced him to commit a crime, which, in his calmer hours, was wholly repugnant to his nature. Whilst he was engaged in the pursuit of pleasure, and surrounded with objects calculated to promote his amusement, and silence the reproaches of conscience; it is not wonderful, he had not leisure for serious reflection. For this cause was Nathan sent unto him, as he only required a gentle admonition, to restore him to the paths of duty, from which he had strayed.

I shall now draw some inferences from the following words, in which Nathan executed his divine mission. "And Nathan said unto David, 'Thou art the man!'" How surprized must David be, at so sudden and unexpected a retort! The indignation he felt, for the oppressive conduct of the rich man, most probably employed his thoughts so entirely, it effaced the remembrance of the act of cruelty, which he himself had

had committed. What remorse and compunction he must suffer, when the prophet convicted him, by the testimony of his own feelings; which were wrought upon by no exaggerated circumstances, but only excited by the artless representation of an arbitrary and violent proceeding, committed by a person in power, on one greatly his inferior, who was entitled to his protection, and to whom he looked for promotion, as a reward for his faithful services.

Lady Mary.

I admire this Parable exceedingly, my dear Mentoria; though I cannot discover how I can apply it to myself.

Mentoria.

Nothing can be more easy, my dear Lady Mary. The moral is briefly this, and may be applied to every state and condition of life. It shews how blind we are to our own failings, and how quick-sighted to those of others. It also instructs us, when we are passing sentence, never to inflict a punishment disproportionate to the offence committed; or what, in the same situation, we should think unreasonable to undergo ourselves.

Lady Mary.

I now think the moral of this Parable very applicable to Lady Louisa and myself; and
sincerely

sincerely hope, we shall both profit by the excellent lesson it contains.

Mentoria.

To inforce what I have already said, I shall produce the following example, to convince your Ladyship of its farther importance and use. If your sister were guilty of any flight of offence, and you suggested to me the necessity of her being severely punished; might I not, with great propriety, make a reply similar to that, which Nathan addressed to David? And whilst you were expatiating with vehemence on the nature of Lady Louisa's fault, I might check and silence you entirely, by saying, "Thou art the girl;" as most probably she is never guilty of any offence, which you have not committed at some time or other of your life. Let me intreat each of you to grow wise, by the example David has afforded you, nor ever subject yourselves to so mortifying a repulse.

DIALOGUE VIII

1797

Of the Government of England
and the System of Education
in that Country

By the Author of the
Dialogues on the Education of the People

London: Printed by J. Johnson, in Pall-mall.

D I A L O G U E VIII.

M O N D A Y.

On the Spartan Form of Government, and System of Education, with Moral Reflections.

Lady Louisa.

MY dear Mentoria, did you not some time ago promise to give us a short account of the *Spartan* form of Government, and plan of Education? If it is agreeable, I wish you would make them the subject of your instructions this morning.

Mentoria.

My dear Lady Louisa, I will readily comply with your request; and hope you will find the research instructive, and entertaining. *Sparta*, or *Lacedæmon*, was situated in *Laconia*,
part

part of the Peloponnesus, now the Morea: which, with many other parts of ancient Greece, is in subjection to the Turks. Lycurgus the Legislator of the Spartan Laws, governed the Lacedæmonians, during the minority of his Nephew. The excellent rules he established for their general conduct, and the attention he paid to the instruction of their youth, have rendered his memory immortal. To prevent all disputes of precedency, he caused the whole country, and private property, to be a common stock, and divided into equal lots. It would have been difficult to have effected this, if gold and silver had not previously been rendered of no intrinsic value, by making the current coin of iron. This stratagem banished many crimes from Sparta; as there was no temptation to rob another of those possessions which were too cumbersome to be concealed. Effectually to prevent any distinctions in the œconomy of private families, Lycurgus established public tables, where no food was allowed, but such as the law directed; they usually were divided into different companies, consisting of about fifteen in each class.

Lord George.

Did the Spartans like these regulations? I should

should think it hard, if such were to take place now.

Mentoria.

Those who had possessed great riches, and been accustomed to live luxuriously, were so enraged at the diminution of their privileges, they rebelled, and proceeded so far, as to pelt Lycurgus with stones: To escape their resentment, he endeavoured to seek refuge in a temple; he outran all his enemies, except Alcander, whose zeal tempted him to pursue Lycurgus with speed and cruelty. As he was turning his head to form an opinion of his own safety, this young man beat out one of his eyes with a stick. Lycurgus bore this unfortunate circumstance, with the greatest fortitude: Immediately stopping short, he shewed his face, streaming with blood, to the citizens; who were struck with the most poignant grief, and delivered Alcander to Lycurgus to be punished as he thought fit: he, instead of inflicting one adequate to his offence, took him into his house, and appointed him to the office of waiting on him as a domestic servant. This unmerited and unexpected lenity, wrought such a change in Alcander's conduct, he afterwards became one of the most distinguished citizens of Sparta; which proves the good effect of forgiving

ing an injury, rather than seeking means to revenge it.

Lady Mary.

I am very sorry, my dear Mentoria, that Lycurgus met with such an accident, as he was so good a man.

Mentoria.

To perpetuate the memory of this unfortunate circumstance, the Lacedæmonians never after suffered a person to enter their assemblies with a staff in their hand.

Lady Louisa.

On what food did the Spartans chiefly live, my good Mentoria?

Mentoria.

The dish held in the highest estimation, was a kind of black broth: The old men who sat by themselves, lived entirely upon it, and left the meat to the younger part of the society.

Dionysius the tyrant, partaking of one of these repasts, complained of the insipidity of the broth. "I am not surpris'd (said the cook) the seasoning is wanting." What seasoning? replied the Tyrant. "Hunger and thirst produced by exercise of various kinds, answered the cook, are the ingredients with which we relish our food."

Lord

Lord George.

Was it not very impertinent of a servant to speak in such a familiar manner to a king? I should think it very extraordinary, if a cook was to speak so to me, though I am not in such an high station of life.

Mentoria.

Your Lordship must remember, that the Spartans had levelled all distinctions in their own commonwealth; and consequently thought themselves freed from paying any great marks of obedience and respect, to those invested with power.

Lady Mary.

Who was appointed to order what there should be for dinner?

Mentoria.

There was a settled plan, which they invariably pursued, as variety would have encouraged the luxury they meant to abolish; for which reason their food was of the plainest kind, that they might not be tempted to eat more than was absolutely necessary for the support of nature. Each member of the Society, contributed to the common stock, and was obliged to send every month, five pounds of cheese, a bushel of meal, eight gallons of wine, two pounds and an half of figs, with a small sum of

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money,

money, to buy fish and meat. Whenever they offered a sacrifice, they presented part of the victim to the common table; and sent a portion of all the game they killed, to the public stock, for the good of the community. Those who had been performing a sacrifice, or been employed in hunting, were permitted to sup in their own houses; no other circumstances excusing their appearance in public.

Lady Louisa.

That, I suppose, was no hardship; as people in general, like to spend their time in company.

Mentoria.

Yet a very different plan was pursued by the Ancients; as moderation, and temperance, were their principal objects; and wisdom, the ultimate end of their wishes; the Spartans sent their children to the public tables, as to seminaries of learning, where they were to be instructed in political affairs, and acquire the art of conversing with ease and pleasantry. They were early accustomed to bear raillery, and as their satire was very pointed, it was thought unbecoming of a Spartan, not to be able to receive a retort with composure. They expressed their sentiments in few words, and generally made their replies in Apophthegms, or
smart

smart sayings. Hence it is, a concise manner of expression is called Laconic; as Sparta was situated in Laconia, from whence the word Laconic is derived.

Lady Mary.

What other customs had they, my dear Mentoria?

Mentoria.

It was a general rule amongst them, whenever a person entered a room, for the oldest member of the Society, to point to the door, and say, "Not a word said in this company, must go out there." They also elected their associates in the following manner; each of the company took a pellet of bread, and threw it into the pitcher, which a servant carried on his head; those who approved him, flung the ball in with altering the shape; whilst those who wished to prevent his being chosen, squeezed it flat; if there were but one of the flatted pieces in the pitcher, the candidate was rejected. Our mode of election by ballot, is nearly the same; which consists of a number of balls, some black, and some white, the majority of either, determining the choice or exclusion.

Lord George.

Lycurgus must have been a very clever man to make such excellent laws.

Mentoria.

To prevent magnificence in their houses, he ordained that their ceilings should only be wrought by the axe, and their gates and doors smoothed by the saw; presuming they would not then be so absurd to furnish their houses in an elegant taste, as it would have appeared unsuitable to the rest of the dwelling.

Lady Louisa.

I hope, my dear Mentoria, you have not finished your account of the Spartans.

Mentoria.

As far only as relates to their form of Government. I shall now examine the diligent and early attention they paid to the formation of the minds of their youth, from their infancy, till they arrived at years of maturity. The Spartan children were considered as a public concern, from whom legislators and heroes were to spring; which is the only excuse that can be offered for the cruel law in force amongst them that, as soon as a child was born, the father was obliged to carry it to a place called Lefche, where a council was held to examine
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the infant: if it appeared healthy and well-proportioned, they allotted him one of the shares of land into which the country was divided; but on the contrary, if it was deformed or sickly, it was cast into a deep cavern, called *Apothetæ*. It appearing to them, neither for the good of the child, nor interest of the community, to preserve a life that in all probability would not be serviceable to the common wealth. The Spartan nurses were held in such high estimation, they were often procured for people in foreign countries, as without swathing the children, they were straight, and well shaped. Their education was esteemed a thing of too much consequence to be trusted to the caprice of the parents: who might, perhaps, have formed a plan, very different to that approved by the Spartan council. To prevent which, when they were about seven years of age, they were ranked in different classes, and lived together, performing the same exercises, and undergoing the same discipline, and partaking of the same recreations. They acquired no superfluous learning; as the chief aim was to make them good subjects, to be able to endure hardships, and subdue their enemies. They were accustomed to go barefooted, with their heads shaved, and almost

naked; which, inured them to the difficulties they were to undergo. After they were twelve years of age, they were not permitted to wear a double garment. They slept on beds made of reeds, gathered by the river Eurotas, and were obliged to break off the sharp points with their fingers, as they were not allowed any weapons for that purpose. To render it warm in winter, they mixed some thistle-down with the reeds, which was thought a great indulgence.

Lady Louisa.

I am very glad there are not such laws in England, as I should not like to live as the Spartans did.

Mentoria.

A man of distinguished abilities, was chosen to super-intend the instruction of these youth; beside whom, there was to every class, a Captain, or what they called, an Irens, who was generally about twenty years of age; and whose office was to preserve order and regularity. Those, who were entrusted to his care, were entirely subservient to his will, and waited on him as servants. The younger ones he sent to gather herbs, &c. and employed those who were capable of higher enterprizes, in stealing wood, and various other articles. They usually effected

effected their purpose, when persons were asleep, or their attention deeply engaged: and if they failed in their attempt, or were caught in the fact, were severely punished.

Lady Mary.

I think it was very wrong to teach them to steal; I dare say, my dear Mentoria, you are of my opinion.

Mentoria.

My dear Lady Mary, you must never lose sight of the plan of life, for which they were intended. As their laws were rather a political, than a moral system, this qualification might be esteemed requisite in a Spartan, whose existence, in a great measure, was to depend on the rapine and plunder, authorized in warlike expeditions. They possessed an uncommon share of fortitude; a remarkable instance of which, we find, in the famous story of the Spartan boy; who being detected in the theft of a young fox, concealed it under his coat, and suffered it to tear out his bowels, rather than make a discovery of his guilt.

Lady Louisa.

I wonder he had such resolution, and am surpris'd he did not cry, when he felt it hurt him.

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Mentoria.

Mentoria.

The sense of shame was so early instilled into their minds, it overcame all other considerations. The Spartans deserve the highest commendation, for the respect and reverence they paid to age. They shewed their elders every outward mark of obedience, always rose from their seat when they entered, and gave place to them on all occasions; neither were they wholly confined to the observance of forms and ceremonies; but were equally attentive to the advice and admonitions of their superiors: by which means, their conduct was proverbially wise and discreet.

Lady Mary.

My dear Mentoria, ought we to copy the Spartans in any of their customs?

Mentoria.

It would be impossible to make them a model for your future conduct; as the affairs of the world are now on a different footing. The Gospel was not revealed to them; consequently, their ideas of right and wrong, were only determined by the law of nature, as they had not the glorious example to imitate, which is afforded us in our blessed Saviour, and his first disciples. Yet, notwithstanding you cannot follow them in the general mode of their practice,

practice, pursue those particular branches, which seem worthy of imitation; such as the reverence paid to age and wisdom; their extreme moderation and temperance in their repasts and recreations; as also the intense application with which they pursued their studies. In every age and country, the exertion of these qualities, will produce the same effect; and render a Briton as famous now, as a Spartan was, several hundred years ago.

Lord George.

I wish, my good Mentoria, you would not quite close your account of the Spartans.

Mentoria.

As I have not omitted any material circumstance; in the continuation of the subject, I shall be reduced to the necessity of enlarging on what I have already enumerated. I have informed you, how highly the Spartan nurses were esteemed; it now only remains for me to point out what gained them such reputation. They took infinite pains to render the infants healthy and robust; yet their excellence chiefly consisted in the attention they paid to the formation of their disposition and manners.

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Lady

Lady Louisa.

What particular methods did they make use of, my dear Mentoria?

Mentoria.

They never indulged the children in fretful and petulant inclinations, and paid no regard to their tears and idle fancies; which entirely discourages the bad habit of caprice and discontent.

Lady Mary.

I am surpris'd all nurses do not act the same. I will advise my little sister's nurse to treat her in this manner.

Mentoria.

Without vanity, Lady Mary, I may venture to affirm, I understand the Spartan manners, better than any nurse: so, that with more propriety, I shall be able to adopt this plan, in the regulation of your conduct. I should think, I was acting a very weak, as well as a very wicked part, if I indulged all your desires; and should not discharge my duty, without I corrected your errors, and pointed out the means to amend them.

Lady Louisa.

What were they remarkable for besides?

Mentoria.

To prevent the children being dainty, they
fed

fed them on very plain food; and accustomed them to eat all kinds of provision, that they might not have a particular dislike to any.

Lady Mary.

I should think it very hard to be obliged to eat what I did not like.

Mentoria.

When a person has a natural and strong aversion to any particular thing, it would be cruel to oblige them to partake of it; in such a case I would not exert my authority: but if it appeared to be the effect of prejudice or caprice, I would use the strongest effort to surmount the difficulty. I could produce many instances of children, fancying they did not like different parts of their food; which, when they had been compelled, or prevailed on to taste, were extremely agreeable to them. This, like most bad habits, makes a rapid progress, if it be not checked in its infancy; which proves how judicious it was of the Spartans, to guard against such a growing evil.

Lady Louisa.

I will never be dainty for the future, and never leave any orts on my plate.

Mentoria.

The branch I am now going to consider, will, I hope, prove an useful lesson to you both; as

it points at your greatest weakness; namely, *Fear*. The Spartans were so undaunted in their nature, they trained up their children, without any sense of unnecessary apprehensions; to effect which, they accustomed them to be alone, and in the dark, to prevent their being timorous and cowardly.

Lady Louisa.

I wish I could get the better of all my fears, and be as easy in the dark as I am in the light.

Mentoria.

I can ascribe Fear but to two causes, which are these; the consciousness of deserving punishment, or the prejudices imbibed in infancy. I impute your fears to the latter, which may be overcome by the exertion of your own reason, and confidence in the assertions of your best friends. The errors which have been instilled into your minds, are so palpable, they are easily confuted; as there requires little to be said, to convince you, ghosts, fairies, and hobgoblins, are creatures of the imagination, which have no existence but in weak and unenlightened minds!

Lady Mary.

Yet, my dear Mentoria, who can deny darkness being disagreeable?

Mentoria.

Mentoria.

It does not appear the least formidable to me. I have no fears or apprehensions then, more than at noon-day, as I consign myself with trust confidence into the hands of my Creator, to whom darkness and light are both alike. Guilt is the only darkness which can disturb our peace; and Innocence, the only light which can dispel our Fears! To enforce what I have already said, I will repeat a few lines I wrote on this subject.

ON FEAR.

Avaunt, vain Fear, thou phantom of the mind,
Stranger to inward peace, to reason blind!
Thou Ignis Fatuus, which misleads the sense;
Against thy inroads, where is the defence?
The shield of Faith, can best defy thy sway;
Ward off thy blows, and thy sharp stings
allay.

Thou coward passion, of ignoble birth,
Whose utmost limits are confin'd to earth;
In heaven, I trust, thy lawless pow'r will cease,
Th' abode of Angels, Harmony, and Peace.

Lady Louisa.

I know a phantom is an imaginary evil,
which haunts the senses, such as ghosts, fa-
xies,

ries, &c. but do not comprehend the meaning of the words, *Ignes Fatuu*.

Mentoria.

They are derived from the Latin, and mean false fire. Hence it is, the meteor, commonly called, *Will with a wisp*, takes that name.

Lady Mary.

For what reason, my dear Mentoria?

Mentoria.

Because, notwithstanding it is a vapour or exhalation of the earth, it has a luminous appearance; and often leads travellers out of the right path, by their mistaking it for the light in a cottage, or some other dwelling.

Lady Mary.

But what resemblance can you possibly find between this phænomenon and Fear?

Mentoria.

I shall soon convince you of the likeness, by pointing out, that they are equally delusive, and produce nearly the same consequences. The meteor carries those, who are unfortunate enough to be misled by its influence, far from the place of their destination; whilst Fear leads those, who are under its dominion, into the labyrinth of folly and superstition.

Lady Louisa.

But, my dear Mentoria, where is the shield
of

of faith, which defends us from Fear? I wish I possessed it.

Mentoria.

Virtues are often figuratively compared to different parts of armour, to imply, that they fortify us against the assaults we meet with in our warfare upon earth. Faith is, for this reason, stiled the shield; as faith or confidence in God, is the only defence which can screen us from the attacks of our enemies, or the dread of an impending evil. Thus St. Paul advised his disciples to gird themselves with Truth, and to have their feet shod with the Gospel; but above all, to take the shield of Faith, which he expressly told them would be able to quench the fiery darts of the wicked. Righteousness he compared to a breast-plate, Salvation to a helmet. The word of God, he also emphatically called, the sword of the Spirit, and the whole accoutrements, the Armour of God, in which every Christian ought to be clothed.

Lady Mary.

Pray, *Mentoria*, what is *Superstition*?

Mentoria.

Superstition causes Fear; and proceeds either from credulity, or the prejudices of education. It is of various kinds; the errors of the Roman Church are a principal branch; as their tenets,

nets, are founded on a system of pretended miracles, and supernatural events. There is another species of a less fatal tendency; namely, the belief of divination, faith in omens, or any mystical process, such as fortune-tellers, conjurers, &c. Those whose minds are weak enough to pay attention to such fallacious guides, and have strong confidence in their predictions, naturally grow timid, and degenerate from their original purity.

Lady Louisa.

What will cure Superstition, and prevent its having a strong influence on our minds?

Mentoria.

Good sense and Superstition are irreconcilable enemies; when they enter into single combat, the former generally comes off victorious.

Hence, Superstition! hide thy daring head,
By weak distrust, and human folly bred!
Subdu'd by sense, the victor of thy fate,
In chains thou shalt appear to grace her state!

Lady Mary.

Are not ignorant people, my dear Mentoria, generally the most superstitious?

Mentoria.

Mentoria.

Undoubtedly; because Superstition is the natural consequence of ignorance. As the sun dispels darkness, so does knowledge clear the understanding from the mists of error and delusion. Let me entreat you to avoid the fetters of ignorance; as the chains which confine the mind, is the worst slavery a human creature can experience. Yet, unlike most other bonds, they may be broken by the strong efforts of our reason.

Oh Ignorance! thou chaos of the mind!
Th' eclipse of reason, to improvement blind.
Thou, like the owl, dost shun the glorious light,
Enwrapp'd in darkness, and the shades of night.
All pow'rful science does dispel thy gloom;
Makes thee expire, and rest within the tomb.
Erects a trophy o'er thy mould'ring dust
Of highest polish, cleans'd from foulest rust!

Lady Louisa.

My dear Mentoria, do you think I shall soon be able to make verses on any subject? I wish you would teach me.

Mentoria.

I shall be content, my dear Lady Louisa, if you are able to express your sentiments with ease and elegance in *Prose*. This can only be
acquired

acquired by practice. We all lisp before we can speak, and walk before we can dance; for which reason be not discouraged, though your productions abound with errors. Do not repeat those you have already committed, and they will every day decrease. An opportunity now offers for you to exert your skill; as affection will suggest to you, the necessity of informing Lady L. of the pleasing event which happened yesterday. First, form the substance of your letter, and then clothe it in as agreeable a dress as possible. I would recommend to your Ladyship, to pay the same attention to the adorning your sentiments, as you would bestow on the decoration of your person. You must be guided in the latter by fashion and the caprice of the times: in the former, by the immutable and unchangeable rules of orthography and good sense.

Lady Louisa.

But what shall I say, my dear Mentoria?

Mentoria.

You would not ask me that question, if she came to pay you a visit; imagine yourself engaged in conversation with her, and you will not then be at a loss. Epistolary correspondence is nothing more than an exchange of sentiments, which ought to be delivered with as much ease and

and freedom as is usually authorized in common discourse, with only this distinction, that we should pay rather more attention to our manner of expression; and be particularly careful to avoid tautology, or the repetition of words; because our errors appear more palpable, when they are recorded, and may yield evidence against us. Divest yourself of unnecessary fears, and cheer yourself with the pleasing reflection, that your best endeavours (even if the performance is imperfect) will be accepted, and entitle you to applause.



DIALOGUE IV.

OF THE HUMANITY OF A GENERAL
EXERCISE OF THE ARTS AND
MANNERS.

THE FIRST PART OF THE
DIALOGUE IS A DISCUSSION
OF THE HUMANITY OF A
GENERAL EXERCISE OF THE
ARTS AND MANNERS.

DIALOGUE IX.

TUESDAY.

On the Sciences; with a general
Exhortation to acquire Knowledge.

Mentoria.

LADY Mary, you once requested me to inform you of the nature of the *Sciences*, which I then declined; if your curiosity is not abated by delay, we will now examine them with the attention they deserve.

Lady Mary.

My desire to be acquainted with their different qualities, is now as strong as when I made the request. Are there not seven Sciences, my dear Mentoria?

Mentoria.

Yes, my dear. I shall consider them in regular order; and consequently begin with
Grammar,

Grammar, on which the principles of every language depend.

Lady *Louisa*.

My dear *Mentoria*, you need not say much about *Grammar*, as we understand it very well. I could answer you any questions you chuse to ask me.

Mentoria.

To put it to the proof, what is a *Noun*?

Lady *Louisa*.

Are not the words man, house, joy, sorrow, all nouns?

Mentoria.

You are perfectly right, my dear Lady *Louisa*, but let me hear your reasons for supposing them so.

Lady *Louisa*.

Because, by prefixing an *article* they make sense.

Mentoria.

They are also of two kinds, the noun *substantive*, and the noun *adjective*. Let me hear you explain them, my dear Lady *Mary*.

Lady *Mary*.

A noun substantive is the name of a thing without any reference to its peculiar qualities: Example.—*The man*; but a noun adjective denotes the properties of the object it expresses,

as

as in the following instances: a *good* man, a *large* house, in which it plainly appears the words *good* and *large* are the adjectives.

Mentoria.

My dear Lady Mary, it gives me infinite pleasure to find you such a good grammarian. In order more fully to explain the rudiments of this useful science, I shall inform you, they principally consist of the different *moods* and *tenses*, which may be divided into the following classes: the *past*, the *present*, and the *future*, denoting our powers of action.

Lady *Louisa*.

I wish you would explain them, my dear *Mentoria*.

Mentoria.

I shall begin by informing you the word *tense* signifies the time in which we speak or act; and the *mood* implies the manner. The *indicative* mood affirms, or is positive. Example: "I am, thou art, he is, &c."

Lady *Mary*.

I hope you will produce some more instances.

Mentoria.

There are many of the moods and tenses so plain, you cannot mistake their meaning. I will endeavour to enumerate those which I think

think require some explanation: The *potential* mood denotes power. Example: "as I may, can, or could walk." The *imperative* mood implies authority, or command: for instance, "Have thou, let him have, let us be, &c." The *optative* mood clearly indicates a wish to obtain, which is as follows: "That I may have, that thou mayest have, that he may have." The *infinitive*, which is the last of the moods, presupposes, and requires a verb, or part of a phrase to precede it, in order to make the sense complete. Example: "I desire to read;" the infinitive "to read," would not be sense without the word desire. I shall say no more on this subject, as you acquire this useful knowledge in the common course of your lessons, and already know the use of the different parts of speech, which consist of the *noun*, *article*, *pronoun*, *adjective*, *verb*, *participle*, *adverb*, *preposition*, *conjunction*, and *interjection*. I shall now, therefore, proceed to explain the other sciences.

Lady Mary.

Which is the next you mean to discourse upon?

Mentoria.

Logic, or the art of reasoning, is an abstruse study, but of infinite use to divines and lawyers;

lawyers; as it enables them to explain mysterious subjects, and reconcile seeming absurdities.

Lord George.

That must be a difficult task, how can they possibly do it?

Mentoria.

By tracing consequences to the cause which produces them, however remote and imperceptible to common observers; by which means they refute errors, and convince the unbelieving.

Lord George.

How do they effect such wonderful things?

Mentoria.

By demonstration, or positive proof: for instance, you would laugh if a Logician told you "snow was black," which he would prove, by informing you that the water was black; and that snow is but water congealed. You would then agree in the belief of what he affirmed, and be encouraged to make researches of the same nature; this is what is called ■ *paradox*. There is another figure of speech called ■ *syllogism*, which consists of three parts, the major, the minor, and the consequence. Example: First, if there is a king, he ought to

I

be

be feared; secondly, there is a king; which, thirdly, implies he must be feared.

Lady Mary.

Is this science of great use, my dear Mentoria?

Mentoria.

Yes, my dear, particularly in all theological or divine writings, learned arguments, and deep researches.

Lady Louisa.

What is the next science, my dear Mentoria?

Mentoria.

Rhetoric, or the art of eloquence and persuasion.

Lord George.

Are Logic and Rhetoric, alike in any respects?

Mentoria.

Not in the least. Logic investigates the truth by axioms, or self-evident principles; but Rhetoric by a fair assemblage of words, and well tuned periods, often causes us to view circumstances through a false medium, and consequently induces us to applaud what we ought to condemn. The powers of eloquence and flowers of rhetoric are irresistible; and when they proceed from a good heart, and are exerted in a good cause, are highly deserving

ing of our praise and admiration. This quality is indispensably necessary, for all public speakers, but more particularly so to lawyers, as the success of the cause they undertake to plead, frequently depends on nice distinctions, intricate points of law, and the narration of facts, which require the graces of speech, and delicate strokes of elocution.

Lady Louisa.

How does Rhetoric make people eloquent?

Mentoria.

By enabling them to express their sentiments according to the rules of art; and to adorn them with the figures of speech called *tropes, metaphors, allegories, hyperboles, &c.* that are nothing more than mental ornaments, on which the internal beauty depends, as much as the external does on dress and exterior decorations. As they neither of them produce an happy effect, if they are not properly disposed, the one should be blended with truth, the other with simplicity and nature. I shall now explain the extensive and useful science of *Arithmetic*.

Lady Mary.

We learn that of our writing-master, and therefore know what it means.

Mentoria.

What he teaches you, is ■ part of Simple

Arithmetic. This science comprehends the use and properties of figures, and consequently is part of the Mathematics. The four first rules, namely, *addition*, *subtraction*, *multiplication*, and *division*, are very necessary parts of your education. If you are defective in these points, you would not be qualified to regulate your affairs, when you come to years of maturity.

Lady *Louisa*.

You say we are taught *Simple Arithmetic*, what other sort is there my good Mentoria?

Mentoria.

The more abstruse part of the science is called *Algebra*, in which letters are used instead of figures, to solve the problems, and ascertain their product, which is of great importance to Mathematicians.

Lady *Mary*.

What are the other sciences, my dear Mentoria?

Mentoria.

The next that will engage our attention is *Geometry*, which is also a principal branch of the Mathematics, and includes whatever is capable of mensuration. Geometrical problems are very entertaining, they teach rules of proportion, and the use of various figures,
such

such as circles, ovals, angles, triangles, quadrangles or squares, octagons, heptagons, hexagons, pentagons, parallel lines, cubes, &c.

Lady *Louisa*.

What are the meaning of these words, and from whence are they derived?

Mentoria.

From the Latin and Greek. The word *Circle* signifies round, and is derived from *circus*, a ring; *Oval*, from *ovum*, an egg, as it bears that form; *Angle*, from *angulus*, a corner, as it implies the meeting of two lines; *Triangle*, from *tres*, three, and *angulus*, a corner, as it has three sides; and consequently *Quadrangle* from *quatuor* and *angulus*, as it has four sides. These are all derived from the Latin.

Lady *Mary*.

The others take their different derivations from the Greek.

Mentoria.

Yes, my dear Lady *Mary*, the word *Octagon* means eight sides; I believe the *Heptagon* has the same etymology, which has seven sides*; *Hexagon* which has six; and *Pentagon* which has five. *Parallel* is taken from the Greek, and means even with each other, yet cannot meet: hence it is, parallel lines imply being at an equal distance. The word *Cube* or *Square*,

I 3

is

* From *επτα*, seven, and *γωνια*, a corner.

is also derived from the Greek, and signifies a die, which is the singular of dice, as it is the same length, width, and depth, and on every side forms an exact square. I have drawn a sketch of these different figures, which, I hope, will be of future service to you, exemplified in plate II.

Lady *Louisa*.

I should like to learn *Geometry*, it seems very entertaining.

Mentoria.

It is not a part of female education, neither can you form a proper judgment from the sketch I have given, any more than you would be enabled to understand a language by only seeing the alphabet. I shall now take a cursory or flight view of *Astronomy*, which teaches the situation or motion of the heavenly bodies. This science, from the close connection it has with *Geography*, may properly be called its counterpart.

Lady *Mary*.

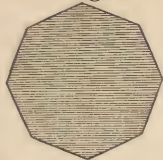
What are the *Heavenly Bodies*, my dear *Mentoria*?

Mentoria.

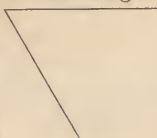
The Sun, Planets, Constellations, &c. The orb of light called the *Sun*, is fixed in the midst of the universe, and is supposed to perform a
a revolution



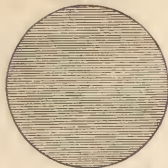
Octagon.



Acute Angle.



Circle.



Triangle.



Square.



Pentagon.



Septagon.



Cube.



Hexagon.



SemiCircle.



Obtuse Angle.



Oval.



Parallel Lines.



a revolution on its own axis from west to east, once in twenty five days; it always shines with the same lustre, and gives light and heat to the whole planetary system. Its diameter is about eight hundred thousand miles.

Lady *Louisa*.

What are *Planets*, my dear Madam?

Mentoria.

They move round the Sun, in a constant and regular course. *Mercury*, which is the least of the primary planets, is next to the Sun, at the distance of about thirty two millions of miles, and is computed to be two thousand four hundred and sixty miles in diameter, and performs its revolution round the Sun, in eighty-eight days. The planet *Venus*, is next to Mercury, and is supposed to be about the size of the Earth, which is computed to be seven thousand nine hundred and sixty miles in diameter, and she performs her course in the space of two hundred twenty four days and an half, at the distance of fifty nine millions of miles from the sun. These are stiled the inferior planets, because their process is between the earth and sun.

Lady *Mary*.

I remember, my dear Mentoria, in your account of Geography, you informed us the *Earth* was a planet, and moved round the sun.

Mentoria.

You are perfectly right, my dear Lady Mary. The Earth is distant from the Sun about eighty one millions of miles, is rather more than seven thousand nine hundred and sixty miles in diameter, and performs its revolutions round the sun in 365 days, which constitutes our solar year. The *Moon* is considered as a secondary planet, and is ever attendant on the Earth, at the distance of two hundred and forty thousand miles. She is computed to be fifty times less than the Earth, and performs her course round it in the space of a month.

Lady Louisa.

We can perceive her process by the light she affords us at some times, which at others is hidden from us.

Mentoria.

We must now consider the superior planets, which are so named, because they are either above, or encompass that of the Earth. The first is *Mars*: its diameter is about four thousand four hundred miles, and its distance from the sun about one hundred and twenty three millions. Its revolution round the sun, is performed in two years wanting forty three days. Next to Mars is *Jupiter*, which is the largest of all the planets. Its diameter is rather above
eighty

eighty one thousand miles, and is distant from the sun about four hundred millions. It performs its course round the sun in twelve years, excepting about fifty days, and is supposed to revolve on its own axis in the short space of ten hours. This planet is constantly attended by four moons, usually called *satellites*, which appear in a direct line with this great orb. Next, and lastly, we find the planet *Saturn*: its diameter is computed to be about sixty eight thousand miles, and its distance from the sun seven hundred and seventy seven millions of miles, and performs its revolution round the sun in the space of twenty nine years and an half. It is attended by five moons, and a ring of great magnitude, which has a luminous appearance. The distances and diameters of the planets, which I have just recited, have been demonstrated by some of the best astronomers; but if the observations on the transit of Venus may be depended on, it requires one-sixth part of each number to be added to the number itself, in order to ascertain the real dimensions of all the planets, except the earth. These divine luminaries, are in themselves dark or opaque bodies, and transmit to us the light of the sun by reflection.

Lord George.

I am impatient to hear what *Constellations* are; I suppose they are stars, my dear Mentoria?

Mentoria.

They are *fixed stars*, because they always preserve the same distances, and are situated in that part of the Heavens called the *Zodiac*, which is the space where the sun and planets perform their respective revolutions. The principal Constellations are the *Signs* of the zodiac, which are as follows: *aries* the ram, *taurus* the bull, *gemini* the twins, *cancer* the crab, *leo* the lion, *virgo* the virgin, *libra* the scales, *scorpio* the scorpion, *sagittarius* the archer, *capricornus* the goat, *aquarius* the water-bearer, and *pisces* the fishes. There are, besides these, fifty-seven Constellations, twenty nine situated on the north, and twenty eight on the south side of the zodiac. The fixed stars do not shine by reflection, but by native light, which is designed to cheer the utmost bounds of the creation.

Lady Louisa.

Have not I heard of *Comets*, my good Mentoria, are they not something very wonderful in the Heavens?

Mentoria.

Mentoria.

They are *blazing stars*, which but rarely appear, because their revolutions round the sun are exceedingly eccentric, and performed at such an immense distance from it, that they take an infinitude of time to complete their course, notwithstanding their progress is very rapid.

Lady Mary.

My dear *Mentoria*, you have not yet mentioned the great number of stars which spangle the Heavens, how many do you think there may be?

Mentoria.

They are ranked in different classes according to their respective magnitude; and in Flamsteed's catalogue they are computed to be in number about three thousand and one, notwithstanding which, there is great reason to think there are an infinitude, which elude the keenest search, and exceed the bounds of human discovery or comprehension.

Lady Louisa.

I wonder how big the Sun is?

Mentoria.

It is computed to be about eight hundred thousand miles in diameter, my dear *Lady Louisa*.

Lady Mary.

What is *Diameter*, my dear Mentoria?

Mentoria.

It implies to go through the middle or centre of any thing, in a direct line, either from top to bottom, or from side to side.

Lady Louisa.

It is the same as *Circumference*, I suppose.

Mentoria.

Not in the least, as *Circumference* means to go entirely round an object, and *Diameter* across it, which makes a very essential difference in the dimensions. It may be useful to inform you, that *Magnitude* means size or bigness; *Plenitude* fulness; and *Altitude* the height of any thing.

Lady Mary.

How much less is the earth than the sun?

Mentoria.

You may easily calculate, when you recollect the earth is about seven thousand nine hundred and sixty miles in diameter, and the sun eight hundred thousand miles. You must also remember, the planet we inhabit, is computed to be eighty one millions of miles distant from the sun.

Lord George.

I am astonished, at so very great a distance
that

that we can perceive its light, or feel the power of its rays!

Mentoria.

Notwithstanding we are so far from it, the inhabitants of that part of the earth which is situated under the meridian of the sun, can scarcely endure the heat, which would be insupportable if they were placed but a few degrees nearer to it. In this, as in every other part of the creation, the wisdom of God is manifested. "The heavens declare his glory, "and the firmament sheweth his handy work!"

Lady Louisa.

I imagine *Astronomy* is a very useful science, to whom is it particularly so?

Mentoria.

To mariners, philosophers, and mathematicians. It is also necessary for persons of education, to pay some attention to this study, as it enlarges the ideas, and enables them to form a just conception of the Deity. The contemplation of the heavens, inspires a rational mind with wonder and admiration, which naturally produce gratitude and adoration, the only acceptable offerings to the beneficent author of these inestimable blessings!

Lady Mary.

Is not *Music* the next and the last science, you intend to explain my dear Mentoria?

Mentoria.

Mentoria.

Yes, my dear Lady Mary, yet I fear it will not be in my power to give you a clear idea of Music, as a person ought to be an adept, or deeply skilled in the art to attempt an explanation of this pleasing science, which comprehends the power of harmony, and may be divided into two parts, *vocal* and *instrumental*. The excellence of the composition, depends on the proper arrangements of different notes, some of which, from their respective qualities, are called *flats*, and others *sharps*, which produce variation of sound, and constitute native, as well as artificial Music. The common scale of music, which consists of various characters to express the different notes, is called the *Gamut*. No person can excel in this art, without a good ear; as the observation of time, and distinction of sound, are necessary for every performer, without which they would produce discord instead of harmonys. One of the chief principles of Music, depend on what is called Concord (which signifies agreement) if this were not attended to, it would be impossible to play in concert, every person having the same notes, notwithstanding different parts are allotted to each; consequently the slightest omission or encroachment

croachment would cause confusion, and spoil the whole effect.

Lady Mary.

I love Music very much, yet fear I shall never excel.

Mentoria.

My dear Lady Mary, the force of genius is very powerful, and generally produces in every art, a greater degree of perfection, than can be acquired by any other means. Those who are defective in this point, must have recourse to the assistance of art, which, by the aid of industry and perseverance, proves a good substitute for genius. A taste for Music, like a taste for most other things, in many persons is not natural, but acquired. We are guided in most of our pursuits, by the advice or example of our companions; if they are studious, musical, or ingenious, it excites emulation in us, to engage in the same course, and pursue the same plan. It is reported of the chameleon, that he takes the colour of the object which is nearest to him, and consequently appears of various hues. We partake more of his nature, than at first sight we are apt to imagine, and are strongly tinged with either the good or bad qualities of those with whom we associate.

Lady

Lady *Louisa*.

I wish, my dear Mentoria, I understood all the sciences, how wise and clever I should be!

Mentoria.

My dear Lady Mary, knowledge-like power, beyond a certain degree, subjects those who possess it, to many temptations and inconveniences. There requires great fortitude to be proof against the shouts of applause bestowed on merit, and the respect and obedience which is paid to grandeur. There are very few who would not turn giddy, if they were transported to the summit of a high mountain, and could scarcely discern the valley beneath. In like manner those, who by birth or abilities, are exalted above the common class, are too apt to make no other use of their pre-eminence, than to look down with disdain on their inferiors. Wisdom and power can never be deemed blessings, unless, like the sun, the former enlightens that part of the creation which is in ignorance or darkness, and the latter cheers and enlivens those who are chilled by the blasts of poverty and oppression!

Lady *Mary*.

Should we not wish to be praised, my dear Mentoria, when we excel in any thing?

Mentoria.

Mentoria.

The love of praise is not only pardonable, but commendable, as far as it proves an excitement to act so as to deserve it. It is only blameable when we make it the motive of our actions, and receive more pleasure from the applause bestowed on a good action, than we did from the silent testimony of the heart when we performed it: seek not the approbation of men, but of God, and be assured your Father, who seeth in secret, will reward you openly.

Lady Louisa.

I think, if I understood all the things you do, my good Mentoria, I should like to shew my knowledge, and talk of them in company. I am surpris'd that you do not.

Mentoria.

If I did, it would make me ridiculous; knowledge ought not wholly to be concealed, yet, like beauty, it appears most amiable, when it is seen through the veil of diffidence and modesty. If you excelled in any art or science, you should not make it the subject of your discourse, or in common conversation express your sentiments in the terms of art belonging to it; as it would make you appear pedantic

dantic and ostentatious. I once was acquainted with a gentleman, who was a great mathematician, whenever I was in company with him, he always used the same expressions, which differed very little from geometrical problems. When he was asked if he chose cream in his tea, this was his constant answer: "Yes, Ma'am, because the globular particles of the cream, render the acute angles of the tea more obtuse." This reply might be tolerably well received for the first time, but from the repetition, and being often ill-timed, disgusted. A mere professional character is always disagreeable. If I were perpetually talking to you of the declension of nouns, or the idioms of the French language, would you not think me a very tiresome companion? how grave you would look, if I insisted before you eat a cake, of your informing me whether it was of an octagon or pentagon form. There are many times I would entirely divest myself of the instructor, to partake of your recreations, and be considered in no other light than your friend!

Lord George.

What did the gentleman mean by the *globular* particles of the cream, rendering the *acute angles* of the tea more obtuse?

Mentoria.

Mentoria.

It is a generally received opinion, that all soft liquors, such as oil, cream, &c. are composed of round, or globular particles, which cause that smoothness in their taste; whilst, on the contrary, acids, such as vinegar, &c. consist of acute or sharp particles, which make them irritate the palate: hence he supposed the richness of the cream would render the roughness of the tea more obtuse, which means blunt.

Lady Mary.

I hope, my good Madam, you are not going to take leave of us for this morning!

Mentoria.

It gives me infinite pleasure, my dear Lady Mary, to find you so attentive to my instructions: and as Lady Louisa and Lord George are equally so, I must bestow the same commendations on them. To excite in your minds a desire to attain all possible perfection in knowledge and virtue, I shall subjoin an exhortation to this laudable purpose, which I sent some time ago to an amiable youth at Eton, entreating him to prosecute his studies with assiduity and attention.

Goon, dearyouth, deep learning's path pursue,
And keep her golden treasures still in view:

Search

Search with attention, for the shining ore,
 Its latent qualities with care explore.
 Learn all their different properties and use,
 And gain the depth of subjects most abstruse.
 Fair science is the clue by which we find
 Th' intricate lab'rinth of the human mind.
 Peruse great nature's book, and her wise laws,
 And in each page, trace the creative cause!
 This will expand and animate thy hopes,
 When systems fail, or high exalted tropes!
 With caution fix, and choose the better part,
 Ever maintain integrity of heart:
 Let sympathetic feelings urge thee strong,
 To acts of kindness, never in the wrong.
 Be this the structure of thy future plan,
 And dedicate to God, the temple—Man!

Lady Louisa.

But these lines, my dear Mentoria, can only
 be a lesson to Lord George, as you wrote them
 to a young gentleman!

Mentoria.

They are (if I may be allowed the expression) *epicene* instructions, and in their tendency of general use to both sexes. I earnestly entreat you to regulate your conduct by the plan therein proposed. Think learning to be the best riches can you acquire, and the works of nature
 the

the best lesson you can study. Feel for the distresses of others, and be ever inclined to redress their grievances. Be guided in all your actions by the dictates of conscience, and the precepts of your holy religion. Dedicate your whole life to the service of God, which will entitle you to receive the reward promised to his faithful servants, namely, eternal life and happiness!



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DIALOGUE X.

W E D N E S D A Y.

On the relative Duties of Life,
with a general Exhortation to
Virtue.

Lady Mary.

MY dear Mentoria, I hope your discourse this morning will be on an entertaining subject.

Mentoria.

I wish it to engage your attention, as from its great importance it will require your serious consideration. Some days ago, I pointed out to you your *religious* duties, or those you owe to your Creator. It now remains for me to
enumerate

enumerate the *moral* and *relative* Duties, all persons are bound to discharge to their fellow-creatures.

Lady *Louisa*.

Why are they called *relative Duties*?

Mentoria.

Because they comprehend the different classes and degrees of duty, respect, or love, which are due to those, who are connected with us, either by blood, friendship, or dependence; such as parents, brothers, sisters, masters, servants, friends, &c. This Duty is so diffusive, it may be traced in regular gradation, from the monarch who sits on the throne, to the most inconsiderable of his subjects. I shall therefore confine myself to the consideration of those particular branches, which seem best suited to your age, and station in life.

Lady *Mary*.

I hope, my dear *Mentoria*, you will explain each of these branches separately.

Mentoria.

With great pleasure, my dear Lady *Mary*. The Duty we owe to our *parents*, bears a near resemblance to that which is due to our Creator; as it consists of gratitude, obedience, and love. The blessings of our creation, preservation,

tion, and redemption, produce religious faith, and impel the mind to adore and worship the Cause from whence they proceed. In like manner, as we derive our existence from our earthly parents, and owe our safety and improvement to their tenderness and love, (which in the helpless state of infancy, we could not acquire by any other means) we are bound to render them the tribute of gratitude, by paying implicit obedience to their commands.

Lady Louisa.

I think we should be very ungrateful, if we did not regard our parents, who express such anxiety for our welfare, and take such infinite pains to make us accomplished.

Mentoria.

Our obligations are so numerous, it is impossible to fix their bounds; neither can I propose any better method, as a rule for your actions, than to be uniformly obedient in your conduct. Observe and practise what is particularly pleasing to your parents; avoid those things which are not agreeable to them; and, upon every occasion, testify your love and duty.

Lord George.

What is the difference between *love* and *duty*, my dear Mentoria?

K

Mentoria.

Mentoria.

They are separate qualities, yet are generally united in a moral or religious sense; which implies, that acts of obedience or duty ought to proceed from love; as fear, or the hope of reward, (if they were the motive) would make the performance rather a sacrifice than an offering.

Lady Mary.

What distinction is there between an *offering* and *sacrifice*?

Mentoria.

An Offering is a voluntary gift bestowed on merit, or presented as a token of our gratitude and esteem: but a Sacrifice implies compulsion and reluctance; as the ceremonies to which they allude were very different in their tendency. An Offering usually consisted of garlands, incense, &c. a Sacrifice, of a victim either burnt or slain, which, in the Jewish and Pagan laws, was required as an expiation for any capital offence, or as an acknowledgment for any great advantage received.

Lady Louisa.

But how can we make amends for their kindness, when we have nothing to bestow on our parents?

Mentoria.

Mentoria.

In the regular course of things, it frequently happens, that parents are brought to an infirm and helpless state, and reduced to a second state of infancy: in such cases, a child is enabled to discharge the debt, by the same means it received it. But as these instances are not very common, there is another opportunity, which proceeds from a less calamitous cause, though it demands our tenderness, and excites our compassion. I mean the gradual decline of life, which requires little attentions, that are often more acceptable than important services; as, like a gentle shower, they revive the withered plant, which requires the prop of filial affection to support it.

Lord George.

Should we do every thing our parents command? If they required us to perform what was unreasonable, or blameable, ought we to comply with their request?

Mentoria.

There is little danger of a parent leading a child into error by design: whenever they mistake the means of their advantage or happiness, the defect is in their judgment. As, in general, parents are too apt to err on the side

of tendernefs, children fhould in every inflance conform, and be fubfervient to their will. Our bleffed Saviour, notwithstanding the divinity of his nature, (which, in fome degree, made him independent of his parents) in various inflances manifested his filial affection; and we are exprefsly told, he was fubject to them. Let me entreat you to make his obedience, as well as every other virtue he poffeffed, the model for your conduct. Imitate his example, and be guided by his precepts; write his instructions on the tablet of thy heart, which will be legible in all thy actions, and make thee an ufeful member of fociety.

Lady Louifa.

Pray, Mentoria, what is our Duty to our *brothers* and *fifters*? I fuppofe we are to love, and be kind to them.

Mentoria.

You are bound to refpect thofe who are older than yourfelf; and to inftruct and protect thofe who are younger. You fhould treat them on all occafions with tendernefs and love; nor ever feek an opportunity to difpute with, or teafe them. Be alfo particularly cautious to fet a good example, to excite emulation in thofe who are your elders, and to afford a
pattern

pattern worthy of imitation to those who are younger.

Lady Mary.

I ought, I suppose, to love to hear them praised.

Mentoria.

You should also seek every opportunity to commend them, and not enumerate every trifling offence: neither are you to think, any praise bestowed on them derogates from your merit. This folly is painted in glowing colours, in the parable of the *prodigal son*. The father, when the prodigal returned, met him with every token of joy, and caused the fatted calf to be killed. The elder brother, who was in the field, when he heard the sound of music, enquired what event had happened, to cause such acclamations of joy; the history informs us, he was displeased, when he found it was to celebrate his brother's arrival, and resolved not to go into the house. His father expostulated with him on the occasion, and intreated him to partake of the festivity his brother's return had occasioned; which had no effect on his obdurate heart. On the contrary, he upbraided his father for never bestowing on him even a kid, to make merry with his friends:

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though when his son returned, who had wasted his substance with riotous living, he gave him even the fatted calf. He then proceeded to exaggerate his brother's transgressions, and to enumerate the advantages his father had derived from his own faithful services; which, however true, came but with an ill grace from his own testimony, and greatly took from the merit of the performance. The tender parent, stung with the reproaches of his child, endeavoured to obviate the charge of injustice and partiality, in the following words: "Son, thou art ever with me, and all that I have is thine. Yet, it is meet that we rejoice, for this thy brother was dead, and is alive again; was lost, and is found!"

Lord George.

Yet had not the elder brother some cause to be displeased, my good Mentoria?

Mentoria.

Not the least, my Lord, when we reflect, that forgiveness is a divine attribute, and that none stand in need of pardon, but those who have offended. As the elder brother's conduct had been unexceptionable, this virtue could not be exercised on him; it being necessary, there should be some offence committed, before

fore reconciliation can be sought, or obtained. The exclamation, which broke forth from his father, manifested the emotions of his heart, and implied, he thought himself bound to reward in the most ample manner the son, who had never given him offence. The concluding part of the sentence contains the lesson I wish to inculcate, namely, that we should unfeignedly rejoice in the advantages of others, and be instrumental in advancing their progress in virtue, or recovering them from error and delusion: that, so far from founding our own praise on the defects or imperfections of our friends, we should repair the tottering building, which fortified by sincerity and friendship, may constitute our strength; as the human species, like the vine, stands in need of a support, without which neither would come to perfection, nor produce the fruits of virtue and abundance.

Lady Mary.

Masters, I think, is the next branch you are to consider. What kind of Respect, or Duty, do we owe to them?

Mentoria.

Superiority, of whatever quality it consists, demands Respect, whether it proceeds from the possession of virtue, knowledge, or power,

in the superlative, or greatest degree. Your masters therefore are entitled to receive every mark of attention you can possibly shew. You should never consider them as your equals, which will prevent any levity of conduct in their presence. You are all indispensably bound to attend to their instructions, which you will retain and profit by, if you acquire the habit of treating them with deference and politeness.

Lady Louisa.

I wish to know, how you would have us behave to our *servants*, my dear Mentoria.

Mentoria.

With humanity and condescension, you should always remember, notwithstanding they are your inferiors, they are your fellow-creatures; and in your conduct towards them, equally avoid haughtiness and familiarity. Maintain your own dignity, nor ever lose it, by permitting a servant to joke with you, or partake of your recreations: such proceedings are not the effect of humility, but of a depraved taste, and meanness of spirit. There are some persons so fond of superiority, they choose to associate with those who are beneath or dependent on them, for no other reason, than the opportunity it affords them of gratifying their inclinations without control or reproach.

Lady

Lady Mary.

We may command our servants, I suppose, to do every thing we like !

Mentoria.

This right, my dear Lady Mary, extends no farther than the bare discharge of their duty, and ought to be exercised with caution and discretion. We should never lay an injunction on them, which appears not possible, or convenient for them to perform; and be ever ready to accept any reasonable excuse for the non-performance. Let us in this, as in every other instance, incline to the side of mercy: let us break the bonds of servitude, and ease our dependents of their oppressive yoke.

Lord George.

How should we conduct ourselves to our friends, my dear Madam?

Mentoria.

We are ever inclined to perform acts of kindness to those we style our friends. This duty is so diffusive, and the motives so numerous, which urge us to the discharge of it, there requires but little to be said on this branch; more especially, as in a former discourse I enumerated the mutual obligations of friendship. I shall therefore proceed to point out the good-
will

will we owe to the human species, without limitation or exception. The philanthropy I mean to recommend, is not only a Duty, but a Virtue: those who exercise it in the superlative degree, must possess benevolence, moderation, and steadiness; and be wholly exempt from arrogance, malice, or prejudices, either personal or national: they must be inclined to redress the grievances of the distressed, comfort the afflicted, and clothe the naked; to which they should be alone impelled by the dictates of the Christian religion, and the force of their own feelings: neither should they wish or expect any reward, but what arises from the consciousness of having performed their duty.

Lady Mary.

I imagine, my dear Mentoria, we are not required to be kind to the Jews!

Mentoria.

Their religious sentiments would not excuse your failing to perform any duty you owed them, as fellow-creatures. Their errors, though fatal in their tendency, demand our pity, as they were a defect of judgment. Our blessed Saviour prayed, that they might be forgiven, as they knew not what they did. Let us join in the same request,

request, and never persecute them. The parable of the good Samaritan affords us an excellent lesson of humanity, and also proves we should do good indiscriminately, and pay no regard to the sect, or outward condition of the object, whose distresses excite our compassion.

Lord George.

Why does this history particularly afford us this lesson?

Mentoria.

Because the Jews and Samaritans were at such enmity, it was thought a capital offence to have the least intercourse: thus the woman of Samaria was surpris'd our Saviour should ask water of her, as he was a Jew.

Lady Mary.

Then it was particularly good of the Samaritan, to take such care of the poor man in distress. You cannot imagine, my dear Mentoria, how much I admire his conduct!

Mentoria.

He acted as every person ought to do, in the same situation; which is, to perform the service required, without any consideration of the advantages which would arise from, or the inconveniences that might attend it. Let us follow his example, and bind up the wounds
of

of the afflicted, pouring in the balm of comfort and consolation. Let us ever practise the exhortation of our Saviour, delivered in these words: "Go, and do thou likewise." Which implies, we should seek an opportunity to testify our approbation of the Samaritan's conduct, by the convincing proof of imitation. "Let your light so shine before men, that they may see your good works, and glorify your Father, who is in heaven!"

Lady Louisa.

Are there any other Duties, my good Mentoria?

Mentoria.

It is necessary, for the good of the community, there should be subordination in the different classes of mankind. I shall consider them under the heads of Superiority, Equality, and Inferiority; which, I hope, will enable you to form a just conception of the several states. Superiority requires the persons who possess it, to act with dignity and caution, to exercise their authority with moderation and justice, and to dispense their favours to those who appear most deserving of them.

Lady Louisa.

What is our Duty to our Equals?

Mentoria.

Mentoria.

Like most other Duties, they are reciprocal, and consist of a mutual exchange of kind offices, and general good-will. As this state equally excludes profound respect, and implicit obedience, it is necessary to point out the medium which should be preserved between these extremes, in order to make the cement of friendship binding. Undue familiarity proverbially produces contempt: we have also scriptural authority, where servile fear is, there can be no love, as love casteth out fear. From which it may be inferred, our deportment towards our Equals ought to be tinged with the respect due to our Superiors, and the condescension and freedom authorized to our Inferiors; which is productive of the pleasing compound, usually called *politeness*. Without the due observance of this amiable quality, the friendly intercourse of society degenerates into Barbarism and Incivility!

Lady Mary.

The state of Inferiority is the next branch you are to explain. I know, persons in that class are required to be obedient.

Mentoria.

This obedience is limited, as they should ever avoid flattering the weakness and imperfections

fections of their Superiors, and in all their actions make a distinction between servility and respect. From the dependence of their state, it is necessary they should conform to the will of their rulers, in every instance, which is not repugnant to reason or conscience.

Lady Mary.

But how will these rules regulate our conduct, my good *Mentoria*?

Mentoria.

You must be actuated by the precept enjoined by our Saviour, "To do to others, as you would they should do unto you." You must therefore pursue the same conduct to your Inferiors, as you would that your Superiors should to you; and pay the same deference to those above, as you expect to receive from those beneath you. To persons who are on a level with yourself, you should perform such services, as seem most acceptable and necessary to the sphere of life in which you move. Be courteous to all; haughty and imperious to none. Be not high-minded, but condescend to those of low estate; and you will be respected by the great, and revered by the humble.

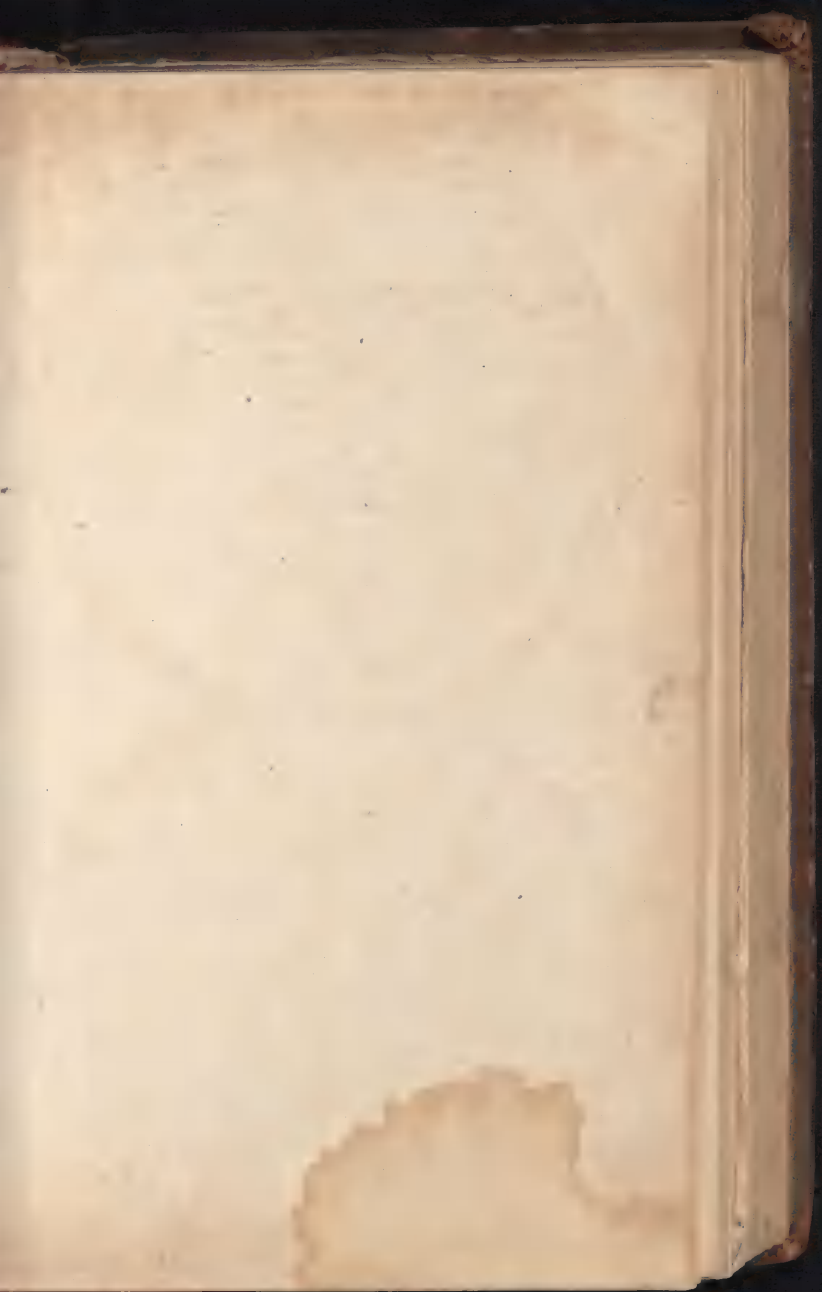
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Excel, and emulate thy parents praise,
Let thy intrinsic worth the fabric raise;
In every useful art thy time employ,
Zealous to gain esteem, true heart-felt joy!
Attain each grace, that can adorn thy mind,
Blended with sentiment, and taste refin'd.
Envy can find no harbour in a breast,
Th' abode, I trust, of peace, more welcome
guest,

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Beatitude divine, and source of rest.
Neglect no duty, act with graceful ease,
Ever desire with modesty to please;
Let Virtue be thy guide, for she'll dispense
Love, happiness, and meek-ey'd innocence.
Oh! may she, kind to thee, her grace impart,
Never forsake, deep rooted in thy heart!

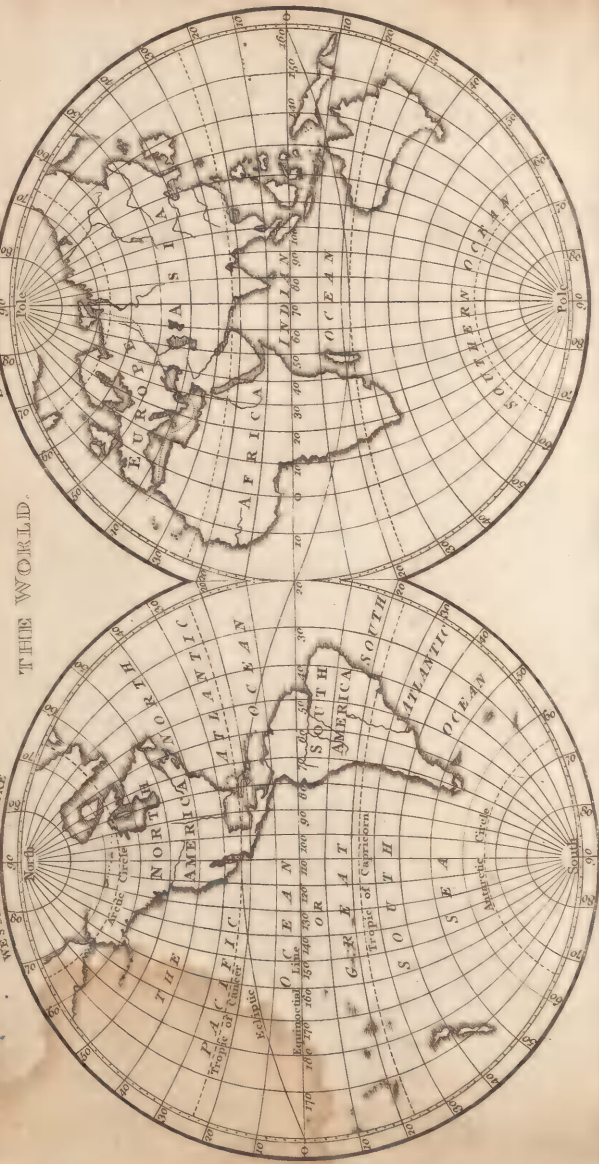
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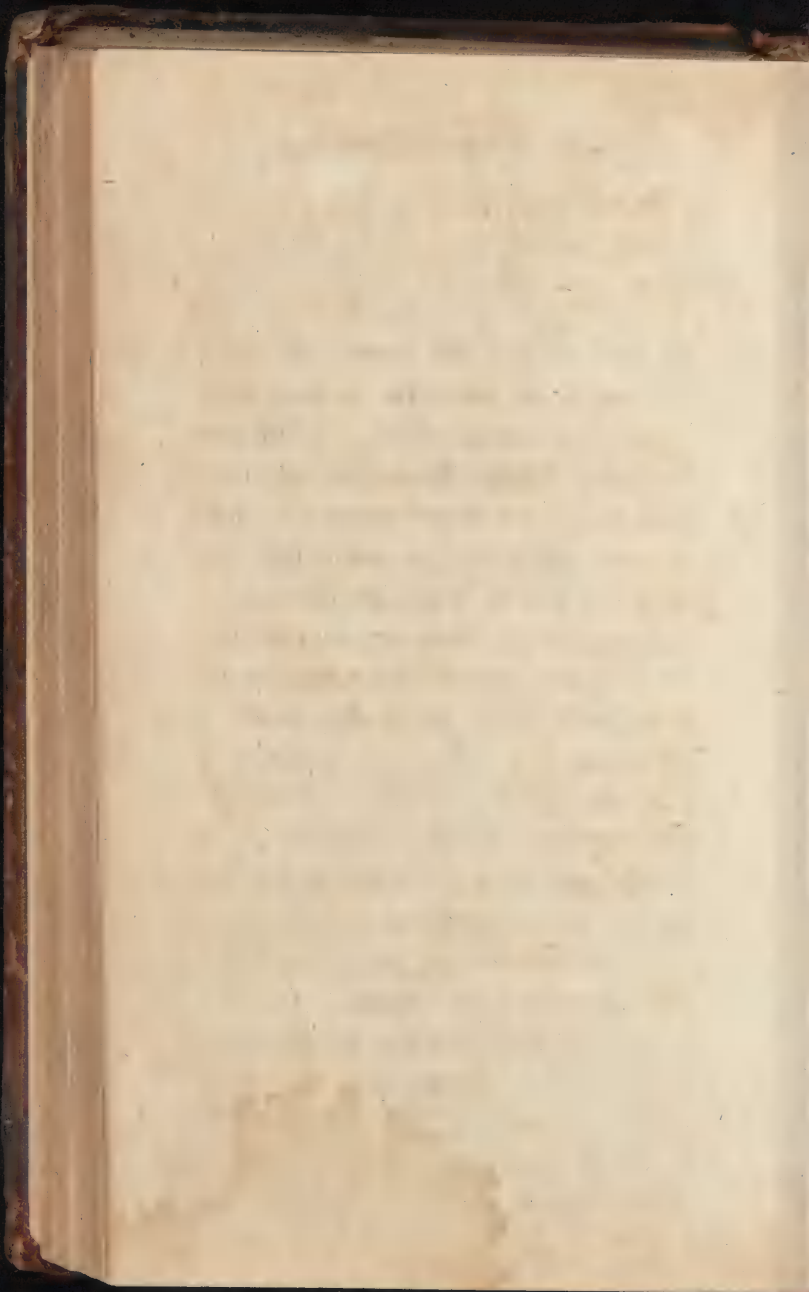
I N W H I C H A R E I N T R O D U C E D,
Lectures on Astronomy and Natural Philosophy,
Expressed in Terms suited to the Comprehension of
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TO HER ROYAL HIGHNESS

THE PRINCESS AMELIA.

WITH the greatest Deference and Respect, I have the honour to present the Sequel to *Mentoria* to your Royal Highness's consideration; if my performance should obtain your approbation, and in any degree prove conducive to your instruction or amusement, my ambition will be amply gratified.

I am perfectly convinced your acquired accomplishments and innate amiable qualities, may justly claim the tribute of Applause; but as Praise is too apt to degenerate into Adulation, I shall pursue the unerring dictates of Simplicity and Truth, and with the most ardent zeal exhort you to persevere in the attainment of Knowledge, in every department of mental cultivation.

Elevated Rank bears no specific weight in the Scale of Merit, unless it is counterpoised by Moral Excellence and Intellectual Treasures; let this considera-

tion excite in your Royal Highness an invariable emulation to Dignify your Illustrious Birth, by the Brilliancy of your intrinsic Virtues.

Accept, Most Gracious Princess, my sincere wishes that you may attain pre-eminence in every ennobling property that can inform the Understanding, or refine the Heart; as the means of effecting this important purpose, diligently explore the wonders of Nature, which will inspire you with implicit reverence for their Primary Source.

These sublime impressions cannot fail to produce in your Royal Highness, that dignity of character and consistency of conduct, which will insure Present Happiness, and entitle you to Future Reward: in the earnest hope that you may enjoy these Blessings to the fullest extent, I remain with the most profound Respect, and perfect Submission,

Your Royal Highness's

Most Devoted and Obedient Servant,

Islington,
25th March, 1799.

Ann Murry.

P R E F A C E.

THE Author presents the following Dialogues on Astronomy and Natural Philosophy to the Public, as the Sequel to *Mentoria*; and flatters herself that they will prove useful to those who favour them with their attention. The subjects she has chosen are of such a sublime nature, and their scientific properties so diffusive and profound, it may be needful to observe, that she has endeavoured to select only those branches that tended to promote the general design of her performance, which was principally to inspire young minds with due reverence

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rence for the universal operations of Divine Wisdom, manifest in the various parts of the Creation. In a work of this kind, it is impossible to offer any thing new, or that has not been more ably discussed by persons of superior abilities and refined classical learning; yet it may be productive of great benefit to the rising generation, to place these axioms or self-evident truths in such a point of view, as to impress the Juvenile Reader with a just conception of the regular order of the Universe, and the collateral dependence of every atom of which it is composed. The prevalent relaxation in the system of moral rectitude, claims the most energetic exertions to counteract its pernicious consequences; and no remedies can be so efficacious as those that, by early permanent impressions, invigorate the principles on the immutable basis of holy confidence, derived from the emanations of the Supreme Being, which Philosophy unfolds, and renders conformable

formable to our finite powers. It may perhaps be deemed presumptuous in the Author, to attempt a work replete with such abstruse and varied subjects for investigation; she therefore as the means of extenuation, begs leave to plead, that she hopes and trusts her zeal will be accepted, as a substitute for the defects which she is conscious the most candid Critic may discover in the execution of her plan. Astronomy and Natural Philosophy should be considered the native spring of dignified human science, as being the source from which the most sublime and general instructions are obtained, it consequently cannot fail to be essentially beneficial, to convey those fertilizing streams of information into a variety of different channels, and to trace their causes and effects in every object our ideas can compass, from the span-gled Etherial Firmament to the opaque regions of the Earth, and the profound abyss of the Ocean. These researches
unavoid-

unavoidably produce conviction of the Divine Efficient Power and Omnipresence, which in youthful minds, unwarped by prejudice, and unsullied by immorality, infallibly operates as an antidote against the inroads of Vice, and in every age, state, and condition, proves a perpetual incitement to Virtue.

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DIALOGUE I.

MONDAY.

On Astronomy, and the Sun, and
Planets.

Mentoria.

I have no doubt, my dear Lady Mary, you recollect that in our conversation on the Sciences, I engaged on some future occasion to expatiate more fully on the subject of Astronomy, on which I wish to fix your attention, and will use my best endeavours to explain the Elements of that sublime study.

Lady Mary. I am rejoiced, Mentoria, you have so speedily fulfilled your kind intention,

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and I shall hope to derive much entertainment, as well as improvement, from your instructions, on a branch of education, of which I have so slight a knowledge.

Ment. You have an idea (though perhaps an imperfect one) of what are usually called the Heavenly Bodies, or luminaries, which appear in the Celestial Hemispheres; I shall therefore proceed briefly to describe the Solar System, which comprehends the Sun, all the Planets, their Satellites, and also the Comets. The Sun, which is the center of this system, continues stationary, that is, always in the same place; but revolves upon his own Axis, in the space of about twenty-five days and an half. The Planets, which are seven in number, constantly move round him in their respective spheres. The names of these Planets, which are ranked according to their several distances from the Sun, are, Mercury, Venus, the Earth, Mars, Jupiter, Saturn, and the Georgium Sidus. Mercury, and Venus, are called Inferior Planets, in consequence of their moving within the Earth's orbit, by which is to be understood, the being nearer to the Sun. Mars, Jupiter, and the Georgium Sidus, are styled superior Planets, because their orbits or
paths

paths are without that of the Earth, which consequently removes them further from the Sun. The term Planet is derived from the Latin word *Planeta*, roving, or wandering, which denotes their quality.

Lady Louisa. I wait with eager expectation to hear your description of the Sun.

Ment. The Sun, which is the source of light and heat, has been ever imagined to be a Globe or spherical body of fire.—Doctor Herschel, in some late observations, appears to be of a different opinion, and asserts, that the Sun is an opaque body, and has hills, and vallies; but as this is a new theory, it may be best to regard it only as such, till the point is proved beyond the possibility of a doubt. The diameter of the Sun is computed to be 893,522 English miles, his distance from the Earth, 95 millions of miles, and his proportion of magnitude compared with the Planet we inhabit, more than a million times as large.

Lady M. I am astonished at your account of the Sun's dimensions: it does not appear of so great a size as you describe.

Ment. Which is to be ascribed to the immense distance the Sun is from the Earth: it is from this cause, that the Moon does not appear small proportioned to her real size,

when compared with the Sun, as she is so much nearer to us, every distant object seeming as a natural consequence less, the farther it is removed from our view.

Lady L. How wonderful it is, that these bodies should appear so bright and perform their courses with such regularity.

Ment. You will cease to be surpris'd at these effects when you consider, that they are under the guidance of Supreme Power and Wisdom; and the further you proceed in your researches, the more you will be convinced, with the Royal Psalmist, that "The Heavens declare the glory of God, and the Firmament sheweth his handy-work."

Lady L. I can clearly discern the brilliancy of the Planets; but have no idea of their form, or substance.

Ment Their figure is that of a sphere, or globe, and their motion consists of revolving, or turning round upon their own Axis, from West to East; they also pursue a regular progressive motion from West to East, through their orbits, and thereby complete their revolving course round the Sun, which is invariably stationed in the center of their system. Their brilliancy they derive from the Sun, as they are

in themselves dark, or opaque bodies, and by reflection transmit to us the light of that glorious luminary. Dr. Herschel is of opinion, they may be possessed of some inherent light; but this is conjectural, therefore not to be relied on.

Lady M. I cannot comprehend what Orbits mean; pray Mentoria be kind enough to explain their signification.

Ment. Every substance that is round, or spherical, may be termed an Orb, and the space in which that body is destined to move or act, is in effect the Orbit. Thus to render the application familiar to your perception, your eye from its round form, may be considered as an Orb, and the socket which contains it, consequently its Orbit; but in a more enlarged sense, it implies the path or course in which any globular body moves, which often figuratively is termed the sphere of action.

Lady L. I now clearly understand the term Orbit, and beg I may not protract your entertaining instructions respecting the Planets; but hope that you will favor us with some further particulars respecting the Sun; as that is a subject that interests me, in more than a common degree.

Ment. I have already mentioned that the Sun revolves on its own Axis in about twenty-five days, it may be proper to observe, that the Sun has also another motion, which is periodical, and is an elliptical, or nearly circular direction round the common center of all the planetary revolutions; and as this center nearly approaches to the Sun, he may with propriety be regarded as the center of the planetary system.

Lady L. How can it be possibly known, that the Sun revolves on its own Axis?

Ment. By observations respecting the Maculæ or spots, which evidently appear upon his surface.

Lady M. I remember your mentioning the spots on the Sun in some of your former instructions: I wonder who first discovered them.

Ment. Galileo the famous Italian Astronomer, who perceived them about the year 1610. Various opinions have been formed respecting their cause, and quality; the most probable conjecture is, that they are occasioned by an eruption of smoke, or other matter, of an opaque nature from the Sun's surface, whilst many suppose they are volcanoes in the Sun; but these are subjects too occult and profound for human investigation. In contemplating the

the splendor, beauty, and universal influence of this glorious luminary, as connected with the solar system, we may with Thomson declare, He is the "best Image here below of his Creator." His beams produce Light, Heat, and every other enlivening property to cheer, invigorate, and perfect the general purposes of existence, in the animal and vegetable world: and to him apparently, we are indebted, (as the instrument of his Divine Creator's power) for every terrestrial blessing that we enjoy: therefore he is not only an object transcendently entitled to admiration, but also a subject worthy of serious attention; as in the sublime language of Milton, we may also observe, that he is "of this great World, both Eye, and Soul; yet must acknowledge God, his greater."

Lady L. I feel very forcibly the just observations you have made on the Sun; and hope that you will now give me a description of the Planets.

Ment. Mercury, which is nearer to the Sun than any other of the Planets, completes his course round him in the space of about 88 days, or nearly three months, which constitutes his year.

Lady M. Excuse my interrupting you, my

dear Mentoria ; but how is it possible that three months should be a year ?

Ment. The word year may be regarded as an indefinite term, as the space of time each Planet takes to complete its course round the Sun, is considered its complete year. The proximity of Mercury to the Sun renders his heat intense, the degrees of which have been computed to be seven times greater than what is experienced in the Torrid Zone, therefore there is every reason to conclude, that the temperature of this Planet, must differ very essentially from that of the Earth, or it could not in the natural course of things long remain in that state, as it has been computed, that the degree of heat Mercury derives from the Sun is 7 times what the Earth receives, which is reckoned sufficient to make water boil. Mercury is but rarely perceived, as he is usually hid in the splendor of the Sun's rays, which prevents the period of his rotation on his own Axis being known. This Planet changes his Phases, by which is to be understood, appearances and positions, in nearly the same manner as the Moon, according to his situation with respect to the Earth and Sun. He never appears quite full, which is occasioned by
his

his bright side being only turned directly toward us, when he is so nearly approached to the Sun, as to be obscured by his beams. By these different Phases it is evident he is not endued with native light, which if he possessed would cause him always to preserve a circular or round appearance.

Lady M. How large is Mercury?

Ment. His diameter is 3261 English Miles, and his mean distance from the Sun 36 Millions of Miles; his motion is so rapid in his revolution round the Sun, it is computed at the rate of 95000 Miles in an hour.

Lady L. In these wonderful instances of Divine perfection, it is not possible to express the astonishment they produce.

Ment. Mercury, which is the smallest of the inferior Planets, as I have before mentioned, can be but rarely seen, as the resplendency of the Sun's beams generally renders him invisible; when he is perceptible he has a bright appearance, blended with a light tincture of blue, as the Orbit of this Planet is between the Earth's Orbit and that of the Sun; if it were in the same plane as the Orbit of the Earth, Mercury would frequently be seen to cross the face, or disk of the Sun; but as the planes of

their Orbits are not perfectly coincident, this but seldom happens; when it occurs, it is called a transit of Mercury over the Sun's disk, the Planet then appearing like a black spot on the face of the Sun: the next that will probably be visible, will be on the 7th of May 1799, an event that you will most likely have the pleasure of viewing if the weather is propitious.

Lady M. I shall have great satisfaction in observing the transit, and we are much obliged to you for affording us this information.

Ment. Venus is the next subject of our attention, and the second Planet from the Sun: her diameter is 7699 English miles. Her revolution round the Sun is performed in 224 days, and her mean distance from the Sun is 68 millions of miles; her diurnal rotation on her own Axis, is nearly 23 hours and a half. This Planet when she appears to the West of the Sun, rises before him in the morning, and is consequently denominated the morning Star; but when she appears to the East of the Sun, she shines after he sets, and from thence is called the evening Star; in each of these situations, she remains alternately, for nearly 7 months and a half. There is great reason to suppose this Planet has an atmosphere, ■■ certain dark
moveable

moveable spots have been discovered on her disk, and astronomers have perceived mountains on her surface. When viewed through a telescope she is but seldom seen to shine with a full face, her phases varying like those of the Moon, and her enlightened part is invariably toward the Sun.

Lady M. Can Venus be perceived, without the aid of a Telescope?

Ment. She can be clearly seen by the naked eye, on account of her peculiar brightness, which exceeds that of every other Planet; her lustre has a whitish appearance, and is so brilliant she is frequently visible in the day time even when the Sun shines, and she has often been mistaken for a Comet, when she is about 40 degrees removed from the Sun. This Planet as a morning Star, is styled by the Poets, Phosphorus. or Lucifer; and when she shines after the Sun sets, and is hence called the evening Star, she is denominated Hesperus, or Vesper. The ancients expressed an extraordinary degree of reverence for this Planet, on account of her beauty.

Lady M. With what delight I shall now view the starry firmament, which before I received your instructions on Astronomy, I did

not regard with the attention and admiration it deserved.

Ment. You have hitherto contemplated these glorious Orbs, as mere ostensible objects, without being able to reflect on their importance, magnitude, or distance; and it is by the aid of Science alone, and the labours of persons of profound learning, that you can possibly acquire a competent knowledge of such important truths. The next Planet to Venus is the Earth, whose annual revolution round the Sun is performed in 365 days, five hours and 49 minutes, being rather more than twelve months; her diurnal rotation on her own Axis is completed in about 24 hours, her mean distance from the Sun is computed to be 95,000,000 English miles, and her Diameter 7920 Miles.

Lady L. Pray Mentoria what is the cause that sometimes there are 29 days in the month of February?

Ment. In order to recover the time that the Earth spends in her annual revolution round the Sun, which by the foregoing statement, you will clearly perceive is more than 365 days, it becomes necessary every fourth year to add one day to the month of February, this is called

Bissextile

Bissextile or Leap year, which consists of 366 days.

Lady L. It appears almost incredible that the Earth should be in constant motion, which must be the case, from the account you give of her rapid progress round the Sun, and her rotation on her own axis.

Ment. In a variety of instances we are required to stretch our belief, when the subjects are above our comprehension; but in the present case, the fact is demonstrated beyond the possibility of a doubt, which is clearly proved, by the vicissitudes of the seasons, the succession of day and night, and a variety of other self-evident means. To convince you of the rapidity of its motion, I shall inform you that the motion of the Earth in its Orbit, is computed at the rate of 68 thousand miles in an hour.

Lady M. I am surprized this rapid motion is not perceptible; I had no idea how fast I was travelling, even when I am asleep.

Ment. Extraordinary as it may appear, it is a certain fact, that the Earth in its revolution on its own axis, moves with a degree of velocity almost incredible to our finite conception; from the most accurate calculations it appears,

pears, that the inhabitants of London are conveyed by this diurnal rotation 560 miles in the short space of an hour ; and at the Equator, it is computed its progress and hourly motion is at the rate of 900 miles.

Lady L. What is the cause of our not perceiving the motion of the Earth ?

Ment. The regularity of its progress prevents your feeling the sensible effect of its revolutions ; if the slightest obstacle occurred, and the motion consequently became irregular, the whole Globe would perceive its force ; but as the Earth is guided in its respective revolutions, by the sustaining hand of an all-wise and gracious Providence, we must cease to wonder at the uniformity, with which it performs its destined courses.

Lady M. I know that the Earth is a sphere, but I wish to be informed of the nature of its surface ; as I think the rocks and mountains must rather alter its globular form.

Ment. The form of the Earth is not perfectly round, but rather flattened at the poles, which is what is called a spheroid ; the rocks and mountains, which are the greatest height form but inconsiderable protuberances on so large

large a body, therefore do not affect the bulk in any material degree. When we reflect on the various properties of this habitable Globe, and trace its qualities as a Planet, we are led in the first place to consider the blessings we enjoy, and in the next, to look forward to those which are in store for us in the endless ages of eternity, when the present state of things will be annihilated, and like the baseless fabric of a vision, leave not a wreck behind!

Lady L. I wish to be informed by what means you are convinced of the Rotundity of the Earth.

Ment. The Earth being nearly of a spherical form, as I have before specified, is confirmed by the following clear demonstrations. The first instance I shall produce, is the circumstance of its having been sailed round, which has been often effected by Navigators steering either in an Eastern or Western direction, and by pursuing the same course, returning to the Port from whence they began their voyage. The next proof is, that we may clearly perceive when we are on the sea-shore, and observe a ship sailing from us, the first part we lose sight of is the hull of the vessel, then the lower parts

parts of the masts and rigging, till by degrees the masts disappear, and the whole object vanishes entirely from our view. When a ship approaches near a port, the contrary effect must be produced, the Mariners first perceive steeples of Churches, and other structures of considerable height, and in regular gradation, houses and inferior buildings, and at last the surface of the Earth becomes obvious to their sight. The irregularity of the Earth occasioned by the inequality of its surface, is no argument in disfavour of its spheroid form, as the projections on its surface occasioned by the contrast of the highest hills, or the lowest vallies, it has been computed, bear no greater degree of proportion, than the inconsiderable protuberances that are found on the rind of an orange, which by no means destroy the symmetry of its form. That we have no sensible proof of these extraordinary truths conveyed to us through the medium of our intellectual perceptions, does not prove a contradiction of their existence; our powers of conception are great, but they are finite, and in a variety of other subjects, we are liable to evident deception, occasioned by the limited impressions our visual organs receive: therefore we must

must be thankful as frail beings, that we know enough to be sensible of the Omnipotence of God, and of our entire dependence on his Providence.

Lady L. Pray, Mentoria, receive my most grateful thanks for your reflections on the blessings we enjoy ; and be assured, I will express my sense of them, by the most zealous efforts of gratitude and praise.

Ment. The next Planet above the Earth's Orbit is Mars, whose revolution round the Sun is performed in one year and 322 days ; his Diameter is 5312 English miles, and his mean distance from the Sun 145 million of miles, and his rotation on his axis is in 24 hours and nearly half, which constitutes the length of his day. Mars when seen through a telescope, is observed like the Moon to encrease and decrease, but never appears horned ; it is therefore natural to conclude, he does not shine by his own proper light, and that his orbit includes that of the Earth. This Planet when viewed by the eye unassisted by glasses, appears smaller than Venus and of a redder hue.

Lady M. I am surpris'd at such a distance
the

the length of time can be determined so exactly, as by hours and minutes.

Ment. These nice calculations are effected by mathematical demonstrations, which reduce such profound subjects to the level of our comprehensions, and by clear simple means, convince the most moderate understandings.

The next subject which demands our attention is Jupiter, which is the largest of all the Planets, and in respect to his distance from the Sun, is the next in rank to Mars; his annual revolution round the Sun is performed in the space of 11 years, 314 days, his Diameter is 90,255 English miles; his mean distance from the Sun is 494 millions of miles, and his rotation on his own axis is completed in the short space of 9 hours and 56 minutes, by which means the velocity of his motion is so great, that at his equatorial parts, it is computed to be 25 times greater than that of the Earth, and its rapidity is ascertained at the rate of nearly 26 thousand miles an hour. The portion of light and heat that Jupiter derives from the Sun are proportioned to those received on the Earth, as 37 to 1000; therefore it is peculiarly fortunate for the inhabitants of this Planet, (and it is highly probable there are such) that he is attended

tended by four satellites, or they would be but in a very cheerless dreary state. The quick succession of day and night is another remarkable instance of divine wisdom; as by that means the speedy return of day counterbalances the other disadvantages of situation. In consequence of the Axis of Jupiter being so nearly perpendicular to his Orbit, he perceives no variations of seasons, and this was mercifully ordained, because if the Axis of this Planet had inclined any considerable number of degrees, the same proportion round each pole would have been involved for nearly six years in impenetrable darkness. When viewed through a telescope, Jupiter is found to be surrounded by faint substances, denominated zones, or belts, which are subject to such variations in their appearances, they have been frequently ascribed to clouds. When observed by the naked eye, Jupiter is distinguished for the white quality of his brightness, and in brilliancy exceeds most of the other Planets excepting Venus, which sometimes is superior in lustre. This is the more extraordinary, when we reflect on his immense distance from the Sun, and must be in a great measure ascribed to his vast magnitude;

like

like Venus, he is sometimes called a morning, and at other times an evening Star.

Lady M. You frequently mention Diameters, are they in any degree like circumferences?

Ment. As the means of defining a sphere, or Globe, we must consider it as a round solid body, the surface of which is equidistant from a certain point called its center, therefore a line drawn from one side to the other, through the center, is called its Diameter, whilst the circumference would imply the going entirely round that or any other object: it may not be unuseful here to add, that the term magnitude means size, or bigness; altitude the height of any person, or thing; and plenitude fullness, all of which point out the dimensions and quality of the respective subjects, to which they are applied.

Lady L. Whenever I heard the Planets mentioned, I thought that they were inconsiderable in size, and by no means of the consequence you represent; indeed I never paid much attention, when they were the subject of discourse.

Ment. This indifference to things seemingly too deep and abstruse for our comprehension,

is one of the principal sources of the ignorance which so frequently prevails, even amongst those who ought to be better informed. On this subject I shall only remark, that on all topics, relative to the œconomy of Nature, and the general state of things, you should ever employ your eyes, and ears, as instruments to convey instruction; as there is scarcely any branch of knowledge that is wholly unintelligible, or that may not in some degree prove a valuable attainment.

Lady. L. I will never neglect any means of receiving improvement; but one does not frequently meet with persons qualified to instruct.

Ment. In that idea you are greatly mistaken, knowledge does not wholly consist in Scholastic learning; but in a great measure is produced by observation and practice. Illiterate persons, and those in the lower classes of life, may afford much useful information, which they have acquired by the regular discharge of their duty, or the prosecution of their respective avocations. Thus a Gardener may improve you in Botany, a Carpenter in Architecture, or a Sailor in the principles of Navigation and Geography, though perhaps they express themselves in incorrect lan-

language, and ambiguous uncouth terms, yet you may safely rely on their assertions, as they are spontaneously the effect of labour and experience, which are the basis of the most essential acquisitions.

Lady M. I will in future listen attentively to every observation I hear; as I am convinced of the advantages I shall derive by that means.

Ment. The most valuable acquirements are obtained by general, rather than by particular modes of instruction; as the most useful information usually arises from existing circumstances, which no formal precepts or elaborate lecture could so well effect. Never neglect any means that can enlarge your stock of knowledge, from the weak pretext it can prove of no use; as experience daily teaches us, that our intellectual powers in the vicissitudes of human life, are called into action by various unforeseen measures, which are to constitute our line of duty. Seek this invaluable treasure with ardour, let not the most humble instruments which impart it be spurned with disdain; as this would be literally refusing a jewel of inestimable value, because the vehicle which conveyed it was apparently of inferior worth.

Lady L. I will always endeavour to consider

sider the intrinsic merit of every object within my powers of comprehension.

Ment. To speak figuratively on this subject, it is not alone from the Cedar of Lebanon, or the stately Oak we are to gain instruction; as even the most humble shrub is fraught with lessons to impress our minds with a sense of the Deity, though his attributes shine with more resplendent majesty in the various orbs which adorn the Firmament. The subject that now demands our attention is Saturn, which is the next Planet to the orbit of Jupiter, whose annual revolution round the Sun is completed in 29 years, 167 days; his Diameter is 80,012 English miles, and his mean distance from the Sun 906 millions of miles. His rotation on his own Axis has not yet been ascertained. As this Planet is about 9 times and half further from the Sun than the Earth, which is computed to be nearly 900 millions, consequently the light and heat he derives from that luminary, about 90 times less.

Lady M. The number of miles these Planets travel in their respective revolutions, will make me think the short journies we take of no importance.

Ment. I am happy to hear it likely to produce

duce that effect, as it is one of the principal ends of Astronomy to enlarge the ideas, and by a due contemplation of the Supreme Being, in these bright trophies of his skill, to form thereby a just estimate of his divine attributes, and also of our own limited powers. I shall now proceed to inform you, that Saturn has seven Satellites or moons, but the most surprising phenomenon is a kind of ring that encompasses his body, which from the most minute and attentive investigation, has been ascertained to be about twenty-one thousand miles distant from this Planet, and to be nearly thirty thousand miles in breadth.

Lady L. What can be the use of this Ring? I have no doubt it answers some important end.

Ment. There is every cause, philosophically and rationally to suppose, that the Planets are inhabited; and no one can doubt, however near or distant from the Sun they are respectively situated, that the constitution, temperature, and other circumstances of the Beings appropriate to each are so constructed, harmonized, and governed, as to form a perfect system, in every respect according to complete the general laws of the universe. This Ring like every other
atom

atom of created matter, undoubtedly fulfils some wise intention and purpose, and most probably was formed to cheer, and in some degree supply the defect of heat, which must follow as a natural consequence, from Saturn's remote distance from the Sun.

Lady M. How surprising these circumstances are; if it were left to my choice to determine, I should be undecided whether I should prefer Mercury, or Saturn, as the Planet on which I was to exist.

Ment. This like many other instances is graciously ordained by a superior Power: the hand that formed us can best allot our place and station. It is not the degree of light and heat, darkness or cold, which is to be our portion, that is to form our happiness, or misery; our proper bliss depends on the faithful discharge of the duties and parts assigned us, therefore we must think the space we inhabit is the most congenial to our nature, and in our ideas aspire to no higher sphere, than the immortal reward revelation insures, as the consequence of uniform obedience.

Lady L. I am very sorry your account of the Planets is so nearly completed.

Ment. The next and last which I have to
C describe

describe is the Georgium Sidus, discovered the 13th of March 1781, by Dr. Herschel; previous to that event, Saturn was considered as the most remote Planet from the Sun. In consequence of this valuable discovery being made in the present reign, it has the appellation of Georgium Sidus given to it in honour of our most gracious sovereign; it is also frequently called Herschel, to perpetuate the ingenious philosopher's fame who discovered it, and therefore is astronomically characterised by an H. being the initial letter of his name, with a cross, symbolically, to denote it was by Christians the Planet was first explored.

Lady M. I cannot express how much I am obliged to you for giving me so clear an account of the Georgium Sidus; what pleasure it must afford Dr. Herschel when he made this discovery.

Ment. The promulgation of any scientific phenomenon may be considered as one of the most brilliant efforts of human skill, as it gives a degree of preeminence to those who are fortunate enough to discover them, superior to every other rank or station. The Georgium Sidus or Georgian, as he is frequently termed, performs his course round the Sun in 83 years,

121 days, his diameter is 34,217 English miles; and his mean distance from the Sun is 1812 millions of miles. In consequence of his immense distance, the period of his rotation on his own Axis has not been ascertained. Whenever this is the case, we are to ascribe it to the being situated so remote from us; as there is every reason to conclude, that all Planets do revolve on their own Axis; though, in some instances, these rotations cannot be perceived by the inhabitants of the Earth. This Planet has two Satellites, or Moons.

Lady M. The great distance Georgium Sidus is from the Sun, must cause it to be very dreary; as I am now enough of an Astronomer to calculate in some degree by the number of miles, of the respective mean distance from the centre of its system.

Ment. The light and heat which this Planet derives from the Sun, is about the 360th part of what is received at the Earth; as his distance from the Sun is computed to be about 19 times that of the Globe we inhabit. As the means of giving you a notion of the climate of the Georgium Sidus, you must endeavour to divide, and subdivide the proportions of light and heat this Planet receives, when compared with the Earth;

which will enable you to form a precise idea, how small a portion of the genial rays of the Sun is allotted to these newly discovered regions. Yet, let us not hence hastily conclude that Providence has not dispensed his blessings with his accustomed liberality ; but rather let us rest assured, this, like every other Planet, and every other part of the Creation, is constructed with unerring skill. The dimensions of the Georgium Sidus are 82 times as large when compared with those of the Earth. Therefore, when we consider the great magnitude, and the stupendous distance this Planet is from the Sun, with what wonder and admiration must we reflect on the power of that Supreme Being who can sustain this, and the other Planetary Orbs, with such order and rapidity, through the regions of the liquid air ! The Planets already specified, are called the primary Planets ; besides which, there are fourteen called secondary Planets, or Satellites, each of which revolves round the primary Planets that are the centre of their motion, as the primary Planets revolve round the Sun. These will be the subject of my future consideration, I shall therefore only subjoin a few observations, and conclude this Lecture. As it is my wish to render
my

Signs of the PLANETS.	Names of the PLANETS.	Diameters, in English Miles.	Periods, in Years and Days.	Mean Distance from the Sun, in Mil. of Miles.
☉	Sun.....	*893522	—	—
☿	Mercury...	3261	0 — 88	36
♀	Venus.....	7699	0 — 224	68
♁	Earth	7920	1 or 365	95
☾	Moon	2161	—	—
♂	Mars.....	5312	1 and 322	145
♃	Jupiter	90255	11 — 314	494
♄	Saturn.....	80012	29 — 167	906
♅	Georgian, or Georgium }	34217	83 — 121	1812

* The Diameters were taken out of Adams's
Lectures.

the following is a list of the names of the persons who have been admitted to the office of the Secretary of the Society since the year 1790. The names are arranged in alphabetical order, and the year of admission is given in parentheses after each name. The names are as follows: (The text is very faint and difficult to read, but the following names are discernible:)

Mr. John A. (1790)
 Mr. John B. (1791)
 Mr. John C. (1792)
 Mr. John D. (1793)
 Mr. John E. (1794)
 Mr. John F. (1795)
 Mr. John G. (1796)
 Mr. John H. (1797)
 Mr. John I. (1798)
 Mr. John J. (1799)
 Mr. John K. (1800)
 Mr. John L. (1801)
 Mr. John M. (1802)
 Mr. John N. (1803)
 Mr. John O. (1804)
 Mr. John P. (1805)
 Mr. John Q. (1806)
 Mr. John R. (1807)
 Mr. John S. (1808)
 Mr. John T. (1809)
 Mr. John U. (1810)
 Mr. John V. (1811)
 Mr. John W. (1812)
 Mr. John X. (1813)
 Mr. John Y. (1814)
 Mr. John Z. (1815)

NAME		YEAR	
Mr. John A.		1790	
Mr. John B.		1791	
Mr. John C.		1792	
Mr. John D.		1793	
Mr. John E.		1794	
Mr. John F.		1795	
Mr. John G.		1796	
Mr. John H.		1797	
Mr. John I.		1798	
Mr. John J.		1799	
Mr. John K.		1800	
Mr. John L.		1801	
Mr. John M.		1802	
Mr. John N.		1803	
Mr. John O.		1804	
Mr. John P.		1805	
Mr. John Q.		1806	
Mr. John R.		1807	
Mr. John S.		1808	
Mr. John T.		1809	
Mr. John U.		1810	
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my instructions as clear to your comprehension as possible, I have avoided all complex terms, and have endeavoured to express myself in language suited to your tender years. I do not intend to strip Science of its dignity or grace, but rather to administer to you such modified portions as your intellectual powers can easily receive and digest. To assist you effectually in your pursuit of astronomical knowledge, I will furnish you with a regular table of all the marks or characters of the different Planets and principal Stars, with their dimensions, distances, &c. which will enable you at one view, to collect all the various instructions on that point diffused through my conversations on this interesting subject. Let your attention be proportioned to my zeal, and by their mutual compact, your improvement will be established on a solid basis.

DIALOGUE II.

TUESDAY.

On the Secondary Planets, or
Satellites, and Comets.

Mentoria.

I HAVE already informed you that there are fourteen Satellites or Moons, which are classed as secondary Planets; I shall therefore proceed to describe their respective qualities, and rotation through their different Orbits. The Moon may be regarded as the first of these Satellites, as she accompanies the Earth in its annual course through its Orbit or path, and is continually revolving round it in an elliptical rotation from one new Moon to another, which she performs in about 29 days, 12 hours, and 44 mi-

44 minutes ; this is called her synodical revolution, besides which, she has another motion that is termed her siderial, or periodical rotation, that is performed in 27 days, 7 hours and 43 minutes ; being the space of time she takes to revolve from one point of the Heavens, to the same again. The diameter of the Moon is nearly 2161 English miles : her mean distance from the Earth 240,000 miles, and her motion in her Orbit is computed to be at the rate of 2290 miles in an hour. As this Planet's rotation on its Axis is performed in the same space of time as her revolution through her Orbit, it evidently appears, that her day and night together, are of the same length as our lunar months, as it is clearly demonstrated, that the Moon turns but once on her Axis during her progress round the Earth.

Lady Mary. I am rejoiced that you are instructing us on the subject of the Moon, which is an object that I admire more than I can express ; and I feel impatient to be informed why it changes and differs in appearance.

Ment. At the period of the new Moon, she is in that part of her Orbit or path, which is between the Earth and the Sun, therefore the whole of her enlightened Hemisphere is turned

from the Earth, and she is said to be in conjunction with the Sun. I make no doubt you recollect, that the Moon as well as the primary Planets, is a dark or opaque body; therefore, the light she dispenses is received from the Sun, by which means, only that half can be illuminated that is turned towards that brilliant Luminary, and the other half must be deprived of light; consequently, the degrees of light we receive, and the different appearances of the Moon, are occasioned by the various positions with respect to the Sun and Earth, which the face of the Moon at different seasons presents to our view.

Lady Louisa. This I clearly comprehend; but what is the next stage of this beautiful Planet?

Ment. When she has performed one quarter of her course through her Orbit, what we perceive of her enlightened Hemisphere, is of a semicircular form; which we denominate her first quarter. When she has performed half her revolution through her Orbit, the whole of her enlightened Hemisphere is turned towards the Earth, in which position she is in opposition to the Sun, and in that state constitutes what is called

called a full Moon. At this period, the Sun and Moon are in opposite parts of the Heavens: the Moon rising in the East, and setting in the West. When the Moon has passed three quarters of her Orbit, she again resumes a semicircular appearance, and is then said to be in her last quarter; and when her whole revolution is compleated, her enlightened Hemisphere is not visible to us, and another new Moon regularly succeeds. As the means of rendering this matter familiar to your perception, if you hold an ivory ball before a candle in a variety of positions, the effect will be clearly evinced by the proportion of light that will be visible on the illuminated part of its Hemisphere. You must also imagine, that if it were possible for you to view the Earth from the Moon, she would exhibit the same phases, or positions as the inhabitants of the Earth perceive, only in direct contrary means; the one being at full, when the other changes, and in a greater proportion, as the Earth yields 13 times as much light as the Moon, in consequence of her superior magnitude; her bulk being about a fiftieth part of the Earth; and as the axis of the Moon is almost perpendicular to the plane of the Ecliptic, she cannot experience any vicissitude

situde of seasons. Many Authors have imagined she has no atmosphere, but later discoveries confirm the contrary opinion.

Lady L. Pray, my dear Mentoria, describe the various appearances the moon exhibits, as its face often seems to change.

Ment. You have no doubt frequently observed that the Moon appears of different shades and colours. When this Planet is viewed through a telescope, it is clearly demonstrated that these varied tints are produced by the contrast of hills and vallies; the mountainous parts occasioning the light spots. It was till lately universally believed, that the dark spots or shadows were seas; but modern discoveries have proved they are concavities or caverns.

Lady L. I am amazed that these things can be discovered with such clear proofs.

Ment. The circumstance of there being hills and vallies, which produce the effect already described on the surface of the moon, is also demonstrated by the border or outer regions of the edge appearing indented about the extremity of the illuminated part, when the Moon is either horned or gibbous. Dr. Herschel has ascertained the height of several of these hills or mountains; and has proved that

very

very few of them, in their perpendicular elevation exceed half a mile; in the course of his observations on this Planet, he has also explored several volcanoes, which emit fire, and from the great similarity there appears between her and the Earth, it is a probable conjecture, that she has not only seas and rivers, but also an atmosphere.

Lady L. You have frequently desired I would request the explanation of any word above my comprehension, therefore I beg to be informed what gibbous means?

Ment. It is an astronomical term often used in reference to the enlightened parts of the Moon, while she is moving from the full to the first quarter, and from the last quarter to the full again; as at those periods the dark part appears horned and falcated, and the light one protuberant, convex or gibbous; as the means of fully explaining this matter, I will inform you that the word falcated, implies crooked, and is applied to express when the moon or any other planet appears crooked or in the form of a sickle.

Lady M. Pray, my dear Mentoria, explain to me why the Moon rises at different times.

Ment. The enlightened part from the new

to the full Moon is turned towards the west, as the Sun is westward of it; but on the contrary from the full to the new Moon, it is turned to the east, as the Sun at that period is eastward of it.

Lady L. Does not the Moon sometimes appear larger than at others?

Ment. The full Moon which happens directly before the Autumnal Equinox, in her dimensions appears larger at the time of her rising than usual, and for several successive evenings rises nearly at the same period, immediately after the full; this is by many called the Harvest Moon.

Lady M. Have I not heard also of a Hunter's Moon?

Ment. It sometimes happens that the same circumstances occur, as I have just described in the succeeding Moon, though not in so great a degree; this is what is often denominated the Hunter's Moon. These extraordinary variations proceed from the Moon's peculiar situation with respect to the Earth at those periods, which would be too abstruse for me to endeavour to explain in terms suited to your comprehension.

Lady L. I have been particularly attentive

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to your remarks on the Moon, which I shall now admire more than ever; I always imagined it had no other use than to afford us light.

Ment. The great Creator of the universe wisely ordains, that his works should coincide to proclaim his divine attributes, and also serve the subordinate purpose of beneficial effects to the various beings he has formed. In contemplating the universe, or at least those parts which our finite ideas can comprise into one system, we shall clearly perceive mutual advantages are the grand outline of the general economy of nature: thus Philosophy teaches us, as inhabitants of a planetary orb, that our Earth transmits light to the Moon in the same manner as we derive it from her. The proportion of light the Moon affords to us, it has been computed is ninety thousand times less than day light, which is insufficient to make any sensible effect of heat; but the light the Earth yields to the Moon is calculated to be 13 times as much, which I have before observed.

Lady L. I cannot possibly express, how much I admire the serenity of a Moon-light night.

Ment. The calm delight that the lunar splendor affords, has furnished Poets with materials

terials for the most beautiful descriptions; every object beheld through this meliorated medium, acquires additional grace, and its benign effects may be traced by the influence they have on the human mind. The light which the Moon in its brightest state reflects from the Sun, is of that mild quality, to concentrate the imagination, whilst more vivid rays would tend to disturb, and extend its range to objects, not so well suited to the purposes of serious consideration, or devout contemplation. The Moon is to the works of nature, what modesty, or diffidence, is in its effects on the moral world; by the diffusion of their gentle beams, the hemisphere of the Heavens, and of human life, are seen through a veil, which invariably adds a superlative degree of Grace to their Beauty.

Lady M. I am extremely sorry that you have closed your account of the Moon; as it is a very interesting subject.

Ment. It is rendered peculiarly deserving of attention, as being the constant attendant on the Earth, which induced me to expatiate so fully on its qualities; but I must now proceed to consider the other Satellites, and inform you that Jupiter has four Moons, these Orbs
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are all of a spherical form, and derive their light from the Sun. Saturn has seven Satellites or Moons, and Georgium Sidus two; these Orbs, or secondary Planets, no doubt were created for the gracious purpose of general benefit to the primary Planets which are the center of their motion, and unquestionably tend to complete the regularity and order of the solar system. I have already mentioned the luminous or bright ring, which encompasses Saturn at a very considerable distance from his body, in which space, the fixed stars may sometimes be clearly perceived. By a late discovery made by Dr. Herschel, it is clearly proved, that this ring is divided into an interior and exterior circle, which are separated from each other by a space of one thousand miles. These Satellites, and Saturn's ring, can only be seen by the aid of a telescope, by which means also, several parallel faint stripes may be observed on the body of Jupiter, that are usually denominated belts.

Lady L. What ingenious things telescopes are, how clever those persons must have been who invented them.

Ment. This like many other valuable discoveries was effected apparently by chance.

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The telescope is reported to have been invented by Roger Bacon in the 13th century; but from the bigotry and ignorance of that æra, it gained no repute, and was wholly neglected, till a fortunate circumstance convinced the learned of its great utility, by the following means. The children of a spectacle-maker at Middleburg in Holland, whilst they were playing in their father's shop, made him observe, that when they held two spectacle glasses at some distance from each other, they saw the weathercock on the Church steeple appear much larger than usual, and apparently very near to them, but reverted. The father convinced of this effect, placed two glasses upon a board, set upright, in two brass circles, which he could fix at what distance he pleased. In consequence of this discovery many resorted to his shop, among whom were Zachariah Janson, and James Metias, workmen of the same town, who improved on the plan first suggested, by adding a tube to connect the glasses, which by sliding in grooves, they could extend to any length. Thus much for the mechanism; but for the scientific advantages, we are indebted to Galileo, Astronomer in the 16th Century to the grand duke of Tuscany, who
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only having heard this valuable discovery mentioned, had so clear an idea of the importance of this instrument, he constructed one on a very large scale, by placing glasses in the long pipes of an organ, by which means he first perceived the Maculæ or spots on the Sun, and its revolution on its Axis; he next observed the four Moons of Jupiter, which he called the Stars of Medicis, in honour of his patron. He had also a glimpse of two sides of Saturn, which have been since ascertained to be the ring I have just described. As he was a man of great learning, he published an account of these acquisitions in the science of Astronomy, and gave a clearer idea of the heavenly bodies than had ever been before attained.

Lady L. How much we are obliged to you, my dear Mentoria, for informing us of the extraordinary means by which the telescope was discovered. I am almost induced to envy the persons fortunate enough to be the projectors of such an important invention.

Ment. I am inclined to think it should rather excite your admiration; for if we were minutely to trace all acquisitions of Science, or knowledge, we should be the more clearly convinced these things are permitted by the wise designs

designs of Providence; and that the persons who effect them are the mere agents, or instruments to fulfil his benign purposes for the general good; as, what we call chance, is a fallacious term, and may almost universally be attributed to a higher source.

Lady M. I will in future endeavour to ascribe all good consequences and important events to where it is most justly due, the Omnipotent Ruler and Creator of the Universe; as every object I contemplate proclaims its natural dependance, and the divine protection it receives.

Ment. Your ingenuous mind may be compared to a mass of snow or wax, as it is as immaculate as the one, and as ductile as the other. Impressions must be received, and from the state of our nature, will be retained; therefore, their quality becomes an object of the first importance. The most ignorant and prophanes are sensible that they exist, and enjoy many blessings; but it is only the enlightened and devout Christian who can be convinced of the means by which these advantages are obtained, or be acceptably grateful to the supreme First, and general Cause!

Lady L. Pray Mentoria, what will be the next subject on which you will expatiate?

Ment.

Ment. The only branches of the solar system I have to explain are Comets: They are solid bodies of various sizes which move round the Sun, and cross the Orbits of the Planets in a variety of directions. Their principal distinguishing marks from the Planets, are their long transparent tails, which proceed from their side farthest from the Sun, and have the resemblance of a pale flame. Their revolutions are exceedingly eccentric, and the Orbits or paths in which they move, Ellipses, or long ovals of a surprising magnitude, having the Sun in one of their foci; in consequence of which, in one period of their rotation, they are so near the Sun as to be in a situation which must render them subject to the influence of the most intense heat, as they sometimes approach much nearer than Mercury to the solar Orbit, at other periods they fly off again to such immense distances from the Sun, they must experience the greatest degrees of cold. That which appeared in the year 1680 came so near to the Sun, its heat, it has been computed, must be consequently 2000 times greater than red hot iron. After which it pursued its course to the remote distance of near eleven thousand millions of miles, which is calculated

calculated to exceed six times the Orbit of Georgium Sidus.

From these circumstances it is evident that Comets are of a solid and durable substance, capable of bearing the variations of extreme heat and cold without being subject to dissolution from their powerful effects; and are also opaque bodies, as the light they shine with is received from the Sun, like the Planets I have before described.

Lady M. I think I have heard you speak of Comets, and call them blazing stars.

Ment. They are sometimes so denominated because they have long tails of a blazing quality which proceed from them.

Lady L. Pray Mentoria give me some idea of the dimensions of a Comet, and the nature of their tails, which you so frequently mention.

Ment. Comets differ in magnitude, some of them are larger than the Moon, though the greater part are inferior in size to that Planet; but as they but rarely appear, and take an immense circuitous range, neither their periods nor dimensions are precisely ascertained.

Lady L. I cannot understand what you mean by the Comets having the Sun in one of their

their Foci, in their periods through their elliptical orbits.

Ment. The term Foci implies the two points of convergency (by which you are to understand the approaching nearer and nearer, tending to one point) in the axis of a curve or lens, therefore Foci is to be considered as the plural of Focus, which signifies concentrating our views or attention to one point or object.

Lady M. Pray Mentoria explain what the Comets' tails are formed of.

Ment. The tail of a Comet is supposed to consist of a great quantity of fume or vapour which proceeds from its body, as it acquires an accumulated degree of heat in its approach to the Sun. Some of these flaming appendages are of a prodigious extent; having been computed to be 80 millions of miles in length. Though the tail is a distinguishing characteristic of Comets, it is asserted some have appeared without them, and in every respect spherical in form like the Planets.

Lady L. What can be the use of Comets?

Ment. Their importance I cannot define, though I may venture to assert, they are of consequence in some degree or means too difficult for me to comprehend or explain. Vari-

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ous conjectures in the early ages of the world were formed from their appearance, as being portentive of some national evil or great event. Many suppose the deluge was occasioned by the near approach of a Comet to the Earth; whilst others, with greater probability, imagine they will be the instruments of effecting the general Conflagration revelation teaches us to expect. As if a Comet, in its return from the Sun, should be in immediate contact with the Earth in its Orbit; the latter must be consumed in the unequal conflict. It is generally imagined that there are at least 21 Comets belonging to our system; the periods of only three have been accurately determined, which have been demonstrated to return at intervals of 75, 129, and 575 years. That which appeared in 1680 was the most remarkable, as its greatest distance from the Sun is computed at 11 thousand 200 millions of miles, whilst its least distance from the centre of the Sun is only 490 thousand miles. Its period is calculated 575 years, and in the part of its Orbit which approaches nearest to the Sun, the velocity of its motion is computed to be 880,000 miles in an hour, and the Sun, as seen from it, appears 40,000 times as large as he does to the inhabitants of the Earth.

Lady M.

Lady. M. From the accounts you give of Comets, and their probable tremendous consequences, I shall be greatly alarmed when any appear.

Ment. I shall endeavour to combat, and I trust shall overcome any apprehensions you may experience on that, or any other subject relative to the laws or order of the Universe. As inhabitants of this terraqueous Globe, we are obnoxious to two kinds of danger; the one I shall term individual, or partial; the other, general, or universal evil; neither of which we can avoid; as a variety of circumstances concur to produce such baneful, or fatal effects. These considerations naturally suggest an entire and unconditional reliance on the decrees and dispensations of Providence, and fortify our minds against the dread of any particular misfortune, or trial: In the course of human events it seldom happens, that the affliction we apprehend occurs, or if it does, the goodness of God enables us to sustain the conflict with due resignation to his divine will. It would be as absurd to dread the fatal consequence of a Comet, as to entertain the idea, that the Sun would fly from its Orbit, or the Sea transgress its bounds. The laws of Nature
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are in the entire disposal of their omnipotent Creator, nor will they deviate from their due course but by his awful fiat ; as they are not guided by the fortuitous effects of chance, but are restrained and directed by unerring wisdom in their respective revolutions and stations. It would be impious and presumptuous to judge of the final effect of things : that terrestrial glory must end, is an article of our religious faith, and the basis of our future hope, which points to Eternity, and the expectation of a superior and more permanent existence. Respecting the means to effect this great purpose, we are not to form opinions from our finite ideas, but rather to conceive, the most awful measures may be used as instruments of executing the avenging decrees of an offended, yet merciful Deity. On this subject I shall only add, many are of opinion that the general conflagration which is scripturally denounced to destroy the Earth, will probably be produced by an eruption of the volcanoes that are in various of its parts ; which theory they support on the argument, that every body possesses inherently the principles or seeds of its own dissolution. I have expatiated more fully on this subject, as I would wish you to be forcibly impressed with every sacred

cred and divine presage, yet to be neither painfully solicitous concerning the period, or the means of their respective fulfilments, nor weakly indifferent concerning a transit that must consign you to endless misery, or supreme bliss; which latter, you will certainly attain if you trust in God, and regulate your conduct by the precepts of the Christian Religion, and the bright example of its Divine Author.

D DIALOGUE

DIALOGUE III.

W E D N E S D A Y.

On Astronomy, the fixed Stars,
and the Zodiac.

Mentoria.

IN consequence of my having finished my account of the solar system, I shall now endeavour to claim your attention whilst I describe the fixed Stars, which are distinguished from the Planets by their constant twinkling, or what is scientifically called their scintillation.

Lady. Louisa. Why are they called fixed Stars?

Ment. Because they never relatively change their situation, but always preserve the same distance

distance from each other, notwithstanding the Earth in its revolution, causes an evident motion in the Heavens. It is imagined these Stars are all distinct Suns placed at immense distances in the Universe, each of which shines by its native light, and forms the centre of a system, round which, Planets revolve with the same regularity as in our solar system, but at too remote a distance to be perceptible to us. As these Planetary Orbs derive light only from their respective Suns, that cannot be transmitted at so immense a distance; which is so great, that even Sirius, or what is usually called the Dog Star, never seems to vary in its size, though in one period of the Earth's revolution it is 195 millions of miles nearer to it than it is in the opposite part of its Orbit. These fixed Stars are ranked in six different classes to ascertain their respective magnitude and distance, according to the degree they are to us apparent. The number that can be perceived in the visible Hemisphere without the aid of a telescope, scarcely exceeds one thousand; but by the assistance of optic glasses, those that may be seen are incalculable. And in proportion as these visual auxiliaries improve, the celestial regions are explored with greater accuracy, and new discoveries con-

frequently made respecting the number and qualities of the heavenly bodies. By various astronomical observations it has been proved, that Sirius, which is nearer to the Earth than any of the fixed Stars, is computed to be distant more than two millions of millions of miles. And it is calculated that if a cannon ball were to fly from thence at the amazing rate of 400 miles in an hour, it would not reach the Planet we inhabit in 570,000 Years.

Lady Mary. I am surpris'd that you describe the fixed Stars as Suns, I always thought there was but one luminary that bears that appellation, or was of equal consequence.

Ment. Qualities and properties, not terms, are what we are to regard in scientific disquisitions; in this instance I do not require implicit belief till I have established sufficient authority of the probability and rationality of my assertions. A variety of opinions might perplex your ideas, and confuse your judgment: I shall therefore only produce Doctor Herschel's sentiments on this subject. He thinks it will scarcely admit of a doubt, that the fixed Stars are distinct Suns; or their immense distance would perfectly exclude them from our view, if the light they emitted were not of a solar quality.

quality. He also carries this analogy still farther, by proving that many, (and most probably all) of the fixed Stars turn on their Axis, and have spots or maculæ on their surface which vary in lustre and appearance. The Stars which he particularly specifies for these solar characteristic marks, are called Lyræcephæi, Antinoi, and Ceti, with many others he does not particularly enumerate. From these observations it is evident our Sun and solar system make but a small part of the Universe. As it is highly probable there are millions of Suns, attended by planetary Orbs, inhabited by myriads of rational beings; all tending to the glory of their great Creator, and uniting to fulfil the general purposes ordained by Divine Wisdom.

Lady L. I am quite convinced by the proofs you have given, that the Earth comparatively makes but a small part in the general mass of the Universe.

Ment. In ascertaining our real importance in the Arcana of Nature, we must imagine an expanse of boundless space, and reflect that if our solar system were annihilated, it would bear no greater degree of proportion of defection in the whole Creation, than if a drop of water

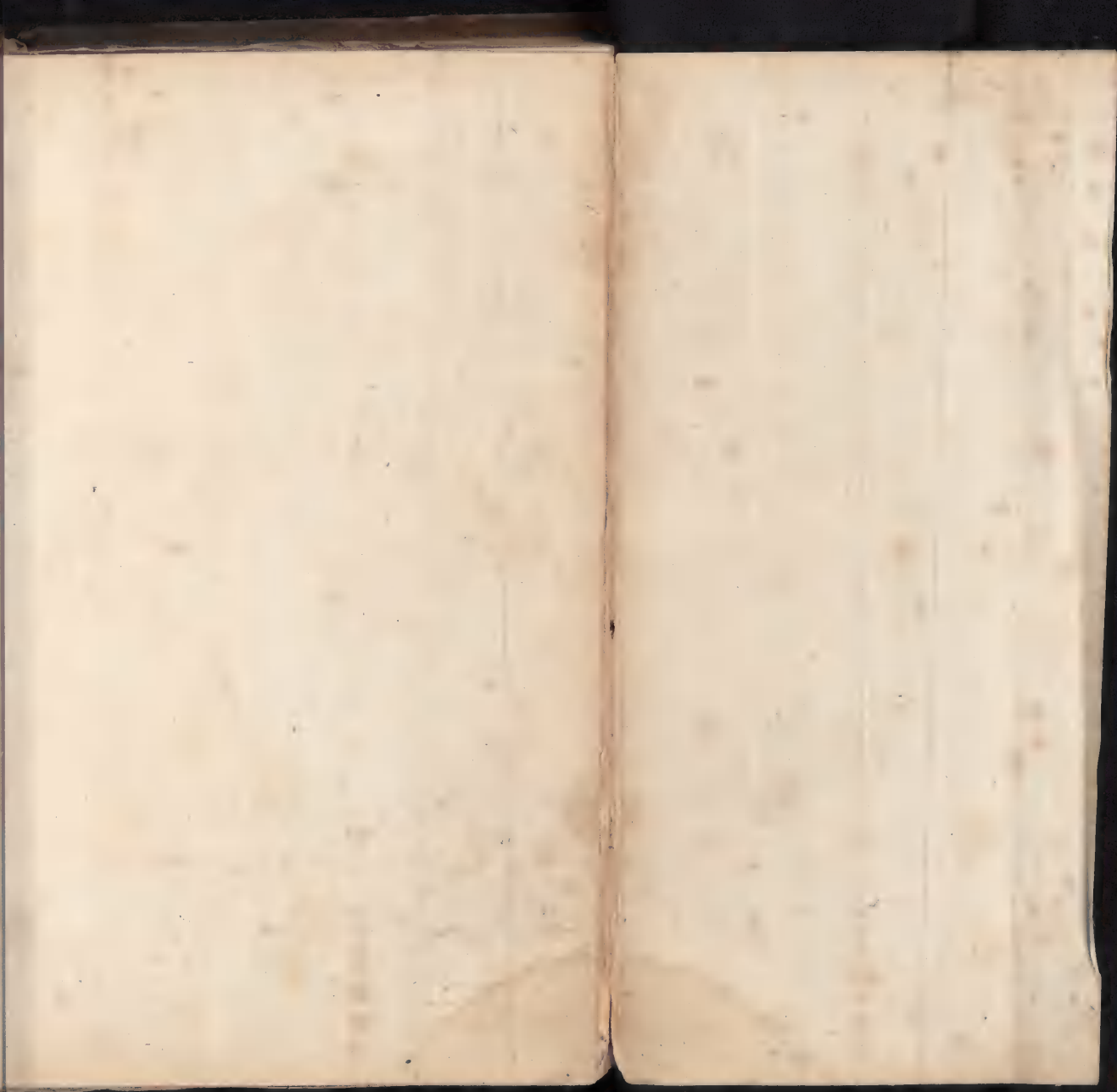
were taken from the immense reservoir of the ocean.

Lady L. Have I not heard of the galaxy, or milky way ; pray what does it mean ? I have an idea it is an astronomical term.

Ment. The galaxy, or milky way, derives its name from the white appearance such an immense number of stars occasions, which unite in illuminating that part of the heavens in which they are situated. Dr. Herschel imagines this broad circle is an extensive stratum of stars, as he has discovered many thousands in it, some appearing double, others treble ; not that they are so in reality, but are stars at different distances, which produce that effect by being seen in the direction of nearly a right line. As the means of rendering my instructions more explicit, I shall subjoin a copper-plate, which will clearly describe the three distinct regions of the Northern and Southern Celestial Hemispheres, and the Zodiac. The ancients expressed these fixed stars by certain imaginary symbolic figures of beasts, birds, fishes, and other animals, which are called Constellations. The number of these stars, including those which have been added in consequence of latter discoveries in the Northern Hemisphere, is 36,
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in the Southern 32, and in the Zodiac 12. Some stars that are not comprehended in any Constellation, are termed unformed stars; others Nebulæ, that have a cloudy appearance; and those that cannot be seen without optic glasses, are called Telescopic Stars. By the invention of John Bayer, a German, about the year 1600, the letters of the Greek alphabet are used to express the stars in each Constellation, according to their regular gradation; though some of the principal fixed stars have distinct names assigned them, of which you shall have a list.

Lady M. I shall endeavour to acquire a thorough knowledge of these appellations, and shall pursue the method you so often have recommended, of writing them in a little book, which will prevent their escaping my memory.

Ment. The Polar Star is the least star in the tail of Ursa Minor, or the Lesser Bear; on account of its proximity to the North Pole, its apparent situation with respect to the earth scarcely varies through the complete period of her annual revolution, which causes this star to serve as an unerring guide to mariners. There are two stars in the Constellation of Ursa Ma-

jor, or the Greater Bear, which are called Pointers, as they evidently point to the Polar Star. Sirius, or the Dog Star, rises and sets with the sun during part of the months of July and August, which space of time constitutes what are usually called Dog Days.

Lady L. By what means can I distinguish the planets from the fixed stars?

Ment. There are two invariable rules which serve to ascertain their distinct qualities, every fixed star twinkles; but a planet has not the least degree of scintillation, they are also always in motion from one part of the heavens to the other, and are visible earliest in the evening, and latest in the morning: whilst the fixed stars constantly preserve the same distances from each other.

Lady M. What occasions the twinkling of the stars, which you mention?

Ment. This effect is produced from the agitated state of the body of air or atmosphere, through the medium of which we view the stars; as the particles, by being in continual motion, cause a twinkling appearance in any distant luminous body: and you must recollect the fixed stars shine with inherent native light,
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and that the planets are of an opaque, or dark quality.

Lady L. You observe that the number of stars which can be seen without a telescope, scarcely exceed a thousand, which surprises me greatly ; as when it is a fine night, they appear to me innumerable.

Ment. The cause of their appearing so much more numerous than they are in reality, is occasioned by their constant twinkling, and the confused manner in which we view them with our natural organs of sight.

Lady M. By what means do the Planets appear like stars ?

Ment. This resemblance arises from the following circumstances. In whatever part of the universe we are, our situation seems to be the centre of a concave sphere, from which remote objects appear at equal distances from us ; thus clearly to exemplify this subject, if it were possible for you to be removed to the Planet Venus, our Earth would seem to be a star to your view ; but if you could be transported to a Planet of another system, our Sun would appear as a Star, and its planetary Orbs would be invisible.

Lady M. Pray inform me what you mean by Constellations?

Ment. The word Constellation literally signifies a cluster or assemblage of Stars : the ancients, in their progressive improvements in Astronomy, calculated several Stars which they divided into distinct companies, or Constellations ; these they expressed by typical figures, according as their fertile imaginations supposed in their combined form they represented any particular object, or had reference to some important consequence.

Lady L. At what period did they make these ingenious discoveries?

Ment. It is not in my power accurately to determine that point ; however it is very certain, that the ancients in the first ages of the world, had some knowledge of Astronomy ; as the Constellations Orion and Pleiades are mentioned in the book of Job : and it is generally supposed that book was written by Moses, during his residence with Jethro, in the land of Midian, above 1500 years before the Christian Æra.

Lady L. I cannot imagine why such names should be given to the heavenly bodies, as they bear no resemblance to animals.

Ment.

Ment. It may perhaps be in my power to throw some light on that subject, by endeavouring to explain the invention of the Zodiac, by which is implied a circle of animals, as that term is derived from the Greek. The Zodiac you are to regard as an imaginary circle, belt, or zone in the heavens, that the Ecliptic divides into two equal parts, which is terminated on either side, by a circle parallel to it, at eight degrees distance, in which space or track the Planets perform their revolutions. I shall now proceed to inform you of the probable means which suggested these astronomical arrangements: in the first state of things we must consider the human race as being placed in a climate and condition subjecting them to few wants, for even the supply of which they could not have recourse to any foreign aid. Thus circumstanced, the first object of importance for them to effect, was the mensuration of time, which could only be ascertained by the motions of the heavenly bodies; the Moon was the primary object of their attention, as by its changes, and periodical returns, they could regulate their affairs with the most exact precision, though totally unskilled in what is usually called Science; and the greatest utility of these disco-

veries was, the enabling persons at remote distances to assemble, for the purposes of divine worship. As their observations were simply the effect of ocular demonstration, they reckoned the New Moon from the period they perceived the Crescent in the firmament; for which purpose they met in deserts, and on high places, as the means of having a clear and extensive view of the horizon; and when they discovered the Crescent, they celebrated the Neomenia, or sacrifice of the New Moon, followed by a feast, of which the assembled families partook; the food having been previously consecrated to the Supreme Being. When any extraordinary event occurred, they also instituted an annual festival, which was added to the Neomenia, and celebrated with great solemnity. Thus you will perceive that the lunar revolutions formed the first system of religious rites, and the equal distribution of time; but as twelve of those were not sufficient to complete the regular returns of the seasons, it became necessary for the ancients to observe the particular stars under which the Sun appeared to them to pass every month, which they divided into twelve equal parts; and as they had no mathematical instruments, they had recourse to the ingenious expedient

expedient of having two copper vessels, one of which they filled with water, and by the peculiar construction of these utensils, the water ran from one into the other; therefore by accurately observing how many times this operation was performed between the interval of each Star's appearance, and the exact mensuration of the quantity of water which alternately filled the vessels, they acquired to a certainty the regular process of the heavenly bodies, which were their only guides in the regulation of their sacred and civil concerns.

Lady L. In what part of the world were the observations first made, which you have enumerated?

Ment. In Chaldea, or Babylon, which you will find clearly explained in my Sacred History, with maps to shew you the exact situation of the regions inhabited by the patriarchal tribes. It may be proper to remind you, that in the primitive state of things, the occupations of the human race were principally of the pastoral kind; tending of flocks, herding of cattle, and attention to agriculture, even in its most laborious branches, were not then regarded as degrading: necessity suggested the importance of these pursuits, and custom and habit reconciled

conciled those who were highest in station to the general adoption of a plan in which their wealth and happiness were comprised. This course of life afforded the ancients many opportunities of making observations on the heavenly bodies, as the nature of the climate, and the quality of their avocations, caused them chiefly to reside in tents, which being moveable habitations, answered their purpose better than fixed dwellings, as they could conveniently change their situations for those that produced the best pasturage for their cattle, which required constant attendance, and by that means enabled them to watch the revolutions of the Stars during their nocturnal attendance on their flocks. As knowledge of every kind is progressive in its operations, the Egyptians who were the most learned people at that early period, having observed the four natural divisions of the year, perceived that the Sun in each of these divisions appeared to be placed successively under distinct Stars; they consequently divided each of the four seasons into three Cantons of different Stars, and the whole year into twelve houses, or stations of the Sun, to which they gave the name of different animals, to denote the quality of the pursuits which were transacted in each particular

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lar period; and as they were very partial to symbolic signs, to express any known object, they had recourse to that method to signify their different tendency and uses; consequently this evidently appears to have been the origin of what is commonly called the Zodiac.

Lady M. I am extremely obliged to you for explaining the first discovery of such an important and interesting part of Astronomy.

Ment. I shall in the next place briefly endeavour to describe why the ancients represented many of these Constellations, or signs, by names and figures, the greater part of which are of the animal kind. As in the early ages of the world, the riches of its inhabitants consisted in the abundance of their herds and flocks, they naturally appropriated to each of the Stars that appeared to them in regular rotation, appellations which had an immediate reference to the production of those creatures, which conduced to their subsistence, and constituted their wealth. The spring Constellations prove this assertion beyond a doubt; the first in order is Aries, or the Ram, as at that season, the month of March, their lambs were brought forth. This Constellation was therefore so named, as the means of teaching them to expect that advantageous

tageous event, when that particular Star was observed; in like manner Taurus, the Bull, in April, was to signify that at that period their cows produced calves; the next Constellation Gemini, or the Twins, in May, was a type or similitude of the fecundity of their Goats, which usually had two kids at a birth.

Lady L. How clearly this appears. I am much entertained by the information you have so kindly imparted.

Ment. I am now come to the summer Constellations, Cancer, or the Crab, which appears in the month of June, was so denominated, as a type that the Sun appeared when he had gained that point in the heavens, to recede or have a retrograde motion, which they expressed by the figure of a Crab, as that animal crawls backwards: this is what is called the Summer Solstice, when the Sun is apparently at his greatest height, and the days consequently the longest in the Northern Hemisphere.

Lady L. What apt similitudes the ancients had recourse to, as means to express the affinity and resemblance that different objects bore to their state and condition.

Ment. The remaining summer signs next present themselves for our consideration. Leo

the Lion, which appears in the month of July, was so called to denote the heat of the weather at that season; which was typified by the fury and rage of a Lion. We next find Virgo or the Virgin, in the month of August, which was the emblem of their harvest, it having been the practice from the earliest periods for gleaners (who were usually females) to collect all the corn that was left on the ground by the Reapers.

Lady L. I shall be sorry when you have finished your account of the Constellations. I had no idea they were so interesting.

Ment. The autumnal Constellations are the next branch to be considered. Libra or the balance in September, is a literal type of the equality of the days and nights at that season, usually called the autumnal equinox; which could not be better expressed than by the representation of a pair of scales. The next is Scorpio or the scorpion; which appears in October, and is so called to denote the baneful diseases which in those regions often raged with violence at that season, which were aptly compared to the sting of a scorpion. Sagittarius or the archer, that makes its appearance in November, was a token to pursue the avocation of hunting, which was necessary

necessary in a country at that time so thinly inhabited, effectually to clear the desarts and forests of wild beasts and noxious animals before the approach of winter.

Lady M. The wise application the ancients made of these advantages does them great credit.

Ment. The first of the winter Constellations is called Capricornus or the goat, which appears in December, and derives its name to exemplify the declension of the Sun at this period, which is what is commonly called the winter solstice, when the days are at the shortest pitch in the Northern Hemisphere; therefore its appellation is remarkably appropriate, as it is the peculiar quality of the goat to climb the highest precipices; therefore the ancients chose this similitude to exemplify the knowledge they had attained that the Sun would for the space of six months gradually advance till it had gained its highest elevated situation. Aquarius or the water bearer, in January, is a lively type of the succession of rain, snow and hail which frequently characterizes that season; and lastly, the Constellation Pisces or the fishes, in February, equally denoted that the fish as a natural consequence, at that period when their native element is more abundant, is from that effect in the greatest degree of perfection: thus
you

you will perceive that the ancients who had no almanacks, and not even an alphabet, were enabled by these symbols to regulate the division of time, ascertain their annual pursuits and expectations with as much precision as we, who by the aid of science can keep regular accounts and transmit our ideas and sentiments to distant regions: but we must cease to wonder when we reflect that the Heavens were to them an index on which all useful necessary information was legibly inscribed.

Lady L. My dear Mentoria, my admiration of these clever people is lost in adoration of the Supreme Being, who wisely ordained these discoveries to be made.

Ment. The world would have been a mere machine of chaos or confusion, had not the goodness of God inspired his frail creatures with the means of reducing his diffused blessings to a general state of order, a lesson that is forcibly inculcated by the observation of the celestial luminaries, which are uniform in their course, and manifest the wisdom and omnipotence of their great Creator.

Lady L. I am surprised to hear you mention the Sun as a body that changes its situation; I recollect your informing me it was stationary in the centre of the solar system.

Ment.

Ment. The Earth's revolution as a Planet, and also on its own axis, were circumstances that were discovered long after the division of the year adopted by the Chaldeans and Egyptians. In the first ages of the world there is no doubt the inhabitants imagined the Earth was a plane or flat surface, and that the Sun constantly moved its position and resumed its course, which produced to them the succession of day and night, and the vicissitudes of the seasons: this was a very natural conclusion, as the mere suggestions of perception could not convince any person unenlightened by science, that the Earth is in constant motion, and that its progress round the Sun is rapid beyond our finite comprehension. It may perhaps in some measure conduce to your amusement, and tend to your improvement if I trace the regular gradations which operated to bring Astronomy to its present state of perfection. Industry and experience are the grounds of the most useful knowledge, the one is a spur to action, the other a guide to valuable achievements.

Lady L. I promise myself much pleasure in hearing your account of the progress of so interesting and sublime a science.

Ment.

Ment. Thales the Milesian about 580 years before the Christian *Æra*, was the first philosopher who taught Astronomy in Europe; he had gained such a degree of perfection in the science, he calculated eclipses of the Sun and Moon, and discovered the rotundity of the Earth. Pythagoras a Greek Philosopher distinguished himself about 50 years after, who, no doubt, from the observations Thales had made, had a clear idea of the revolutions of the celestial bodies, which suggested to him the probability that the Earth was in motion, and that the Sun remained stationary: as this opinion was contrary to the general belief or perception, this new system gained no great progress, nor was ever much esteemed by the ancients. As the means of reconciling this contrariety of sentiments on so important a branch of philosophy, the most learned men at that period endeavoured to establish an intermediate system; therefore Ptolemy an Egyptian philosopher, who flourished above 138 years before Christ, formed a system which he constructed on a plan to reconcile the contending parties. His opinions tended to confirm that the Earth was fixed immovably in the centre of the Universe; that the seven Planets (considering the Moon as one of the primaries) were placed

placed near to it; above them he asserted was the firmament of fixed Stars and chrystaline Orbs, then the Primum Mobile, by which you are to understand the first principle of motion; and lastly, the Cœlum Emperium or Heaven of Heavens. All these immense Orbs he imagined moved round the Earth once in 24 hours; as the means of accounting for these revolutions, he conceived a number of circles called eccentrics and epicycles crossing or intersecting one another, consequently perpetually interfering in their progress; this system was universally received from the time of Ptolemy to the revival of learning in the sixteenth century. It is uncertain by whom artificial globes were invented, yet it is clearly known that Hipparchus, and Archemides, about 200 years before the Christian Æra, by their respective improvements in Geometry and other branches of the Mathematics, rendered the use of the spheres to be relied on, by making them correspond with the aspect of the Heavens, and the motion of the Stars.

Lady M. I cannot express how much I esteem myself obliged by the instructions you give us; I hope essentially to profit by so much useful information.

Ment.

Ment. Notwithstanding the Europeans were in some degree emerged from the abyfs of total ignorance ; yet ſcience or what we rank as knowledge was but in the dawn of its luſtre ; prejudices prevailed, which gradually abated as bigotry declined and the errors of religious faith were vanquiſhed by the firm eſtabliſhment and happy effects of the reformation. Previous to that event learning was chiefly poſſeſſed by the heathen Philoſophers, who advanced certain ingenious opinions and moral precepts in their ſchools ; and in times not quite ſo remote, by Monks and Friars, whoſe intereſt it was to keep the community in a ſtate of profound ignorance ; as when once the human mind became enlightened, their dominion was at an end.

Lady L. How thankful we ought to be that we live in an age ſo conſpicuous for the attainment of every deſirable acquiſition.

Ment. I muſt now proceed to inform you that Copernicus, a native of Poland, who was of an enterpriſing eccentric genius, about the period Anno Domini 1530 ventured to adopt the Pythagorean or true ſyſtem of the Univerſe : this doctrine, however juſt in its principles, had been ſo little attended to, that the Philoſopher who was the inſtrument of its reſtoration

was

considered by the generality of persons, as the inventor or founder of the system, which from thence obtained the name of the Copernican philosophy. The religious feuds and the combined selfish views of the professors of Christianity at that period, greatly tended to check the establishment of a theory which has since been found to have been formed on a rational basis. The controversy which arose from some persons embracing and others rejecting the systems I have enumerated, gave rise to many absurd opinions respecting the oeconomy of the Planetary Orbs : In this state of disputation, Tycho Brahe, a Dane of noble extraction, being convinced of the defects of the Ptolemaic system, but averse from acknowledging the motion of the Earth, attempted about the year 1586 to establish a new theory of his own fabrication, which was still more complex and inconsistent than the one formed by Ptolemy. The principal opinions he advanced were, that the Moon had a monthly motion round the Earth as the centre of its Orbit : the Sun he considered as the centre of the Orbits of Mercury, Venus, Mars, Jupiter and Saturn. The Sun he supposed with all these Planets revolved round the Earth in a year, and even once in the short
space

space of twenty-four hours; this system, notwithstanding its palpable errors, met with many advocates, and Longomontanus so far improved and refined upon its tenets, as to admit of the diurnal motion of the Earth, though he denied its annual revolution. This we must allow was one essential point gained, and was undoubtedly the infant state of that philosophical perfection which was attained in the 17th century, in which science may have been said to have gained its meridional height. About the year 1610 Galileo a Florentine, whom I have previously mentioned as being the means of first applying telescopes to astronomical purposes, discovered new arguments to prove the motion of the Earth, which tended to confirm those before advanced; but as these opinions were under the influence of Papal authority, thought inconsistent with the religious principles he professed, Galileo was compelled to renounce these rational ideas, as they were considered a heresy or offence against the Church, though in effect only like every other branch of knowledge militating against its usurping oppressive ministers or priests. In this struggle, or scientific conflict, it remained for one superior genius to complete what so many had endeavoured in vain to compass with

E

permanent

permanent effect, and this honour was reserved for Sir Isaac Newton, who flourished about the end of the 17th century. This eminent philosopher was a native of Great Britain, and was as much esteemed for his private virtues, as admired for his distinguished eminence in the most profound and occult branches of science: as he was a good man in the most comprehensive sense of the word, and a zealous sincere christian, his researches all tended and co operated to display his reverence for the Supreme Being, whose works which shine with superior glory in the Heavens, he traced with accuracy, and defined with a degree of precision which have rendered his fame immortal. It is to the labours of this renowned Philosopher we are indebted for obtaining just conceptions of the various properties and motions of the celestial bodies, and also for the discovery of the principles of the general law of Nature which regulates their respective revolutions. This law is termed Gravity or Attraction, and is the same by which any body falls to the ground when disengaged from what supported it. The universal gravitation of matter to its common centre is a general principle, and may be traced in regular gradation as to its effect, from the Planetary system to the most incon-

inconsiderable object on the terrestrial globe : as every particle gravitates or tends to its central point, which is produced by the powers of Attraction. It has been clearly demonstrated that the natural effects of Attraction and Gravitation keep the sea in its due bounds, and also the various bodies which cover the surface of the Earth from flying into the air ; it has the same operation on every part of the universe, confines the Planets in their proper Orbits, and preserves the whole fabric of Nature from disorder and confusion. I have expatiated very fully on the advantages we have derived from Sir Isaac Newton's valuable discoveries, and cannot adopt any better means for concluding his deserved eulogium, than by citing Pope's concise epitaph, which in a small compass implies the superior lustre of his genius and fame.

Nature, and Nature's laws, lay hid in Night ;
God said, let Newton be, and all was Light !

Lady M. I admire the account you have given of Sir Isaac Newton, and am much obliged to you for quoting the epitaph, which so fully expresses the great effects his genius produced. I suppose when first these philosophers

talked of the Earth moving, they were thought absurd, and very few believed them.

Ment. In all instances, when the human mind is converted from chaotic ignorance, the first effort must require strong conviction to efface the influence of prejudice and fixed habits of thinking; yet when facts are clearly deduced, and opinions embraced, on the evidence of reason, rays of knowledge diffuse their light and become objects of admiration and belief. Persons whose minds are uninformed, are not always credulous, and apt to receive new opinions; suspicion and ignorance go hand in hand, which are material obstacles to essential improvement and the general diffusion of knowledge. I remember in the course of my reading to have met with a remarkable proof to this effect, in the following instance.

To the best of my recollection, an ambassador was sent from a Northern Potentate, to a Prince in some torrid region, who naturally enquired for an account of the country he came from. When the ambassador described the sea as frozen, and the ground covered with snow, which he represented as a beautiful white substance, the ignorant Prince dismissed him, and sent him back with this message, that he
could

could not think of forming any treaty with a nation whose minister was such a notorious liar. Another fact may also be produced of a similar tendency. When St. Paul was pleading his cause before king Agrippa; whilst he was discoursing on the resurrection of the body, Festus called out with a loud voice, "Paul thou art beside thyself, much learning doth make thee mad"! Thus we perceive in both the instances I have specified, ignorance proved a bar to conviction.

Lady M. Yet I can hardly blame the Prince, as the country he lived in presented no such objects, as the ambassador described; and I imagine Festus, as he was not a Christian, did not believe in the Resurrection.

Ment. The evidence or belief of circumstances beyond our comprehension, in religious subjects, is produced by what is theologically called Faith, which is indispensibly required in all matters concerning the promises of God, and the facts that are related in holy writ. In circumstances of lesser importance, we should ever give credit to respectable testimonies; as our ideas must be very contracted, if we only believe what we see, or what we hear, which comprehends what is usually called ocular and

auricular demonstration, or proof. Philosophy clears the path of profound ignorance, by planting knowledge in the various departments of Science and other general vehicles of instruction; and Revelation removes every doubt, and affords every hope a reasonable being can form. Even the Resurrection of the Body, which was a stumbling block to Festus, who was a Heathen, is a beacon of hope to a devout Christian; nor can the intellectual powers doubt, which perceive vegetation renewed, though apparently in the indissoluble bands of death, but that in a future state their own existence will bloom, through the endless ages of eternity.

Lady L. I am greatly obliged to you for placing these observations in a point of view to impress on my mind a due sense of their importance; as knowledge is such a valuable acquisition, I am surprised any persons remain in a state of ignorance.

Ment. A variety of circumstances conspire to check the zeal for attaining this treasure; in the first place there are many who do not possess the means, and others neglect those opportunities which are afforded them. Perseverance is a necessary ingredient in compassing this desirable end, yet but few comparatively have resolution

solution to apply closely to any particular study, and those who are surrounded by objects to excite useful enquiry, are often too supine, to turn them to due advantage. How many with extensive Gardens, stored with native and exotic Plants, neglect the study of Botany? How many with Libraries amply furnished with the productions of the best authors, read only trash, the offspring of some flippant writer? How many, surrounded by all the beauties of Nature, despise their simple yet majestic charms, and devote their time and attention to all the delusive fripperies of Art? These much to be lamented truths, are the primary source of depraved or uncultivated intellects; as the soil or quality of the understanding is of such a nature, that if we neglect to adorn it with fruits and flowers, it will spontaneously be over-run with noxious and baneful weeds.

Lady M. It should inspire us with gratitude, that we receive an Education that inculcates all important branches of knowledge.

Ment. The learning you should be zealous to acquire, consists of that genuine kind of information that will bear the test of critical investigation. There is a species of superficial knowledge, that may be compared to tinsel,

which is glaring in effect, without possessing any real lustre, and when put in competition with sterling gold, bears no proportion in intrinsic value. Let your pursuits be well directed, and your application uniform ; as wisdom is not to be acquired by flights of fancy, but must be fought with ardour, and cherished by reflection.

DIALOGUE

NORTHERN CONSTELLATIONS.

CONSTELLATIONS.	ENGLISH NAMES.	PRINCIPAL STARS.
Ursa Major, or Helice....	The Greater Bear...	Dubhe, in neck. Aliath, and Benenatch, in tail. Alcor, small one in tail.
Ursa Minor.....	The Lesser Bear....	Cynosura, (the Polar Star) in tail. Kochab, in neck.
Draco.....	The Dragon.....	Ras Tabin, in head.
Cepheus..... [and Chara]		Alderamin, in left shoulder.
Canes Venatici (Asterion,	The Hounds	
Bootes.....		Arcturus, in coat. Ceginus, in right shoulder. Mirach, in belt.
Mons Menalus		
Coma Berenices.....	Berenice's Hair	
Cor Caroli.....	Charles's Heart	
Corona Borealis.....	The Northern Crown	Alphacca, or Lucida Coronæ.
Hercules, or Engonafi.....		Ras Al Giethi, in head. Rutilicum, in left shoulder. Marfic, in club. Maafym, in right arm.
Cerberus		
Lyra, or Vultur Cadens.	The Lyre.....	Lucida Lyræ.
Cygnus.....	The Swan.....	Deneb Adigege, in tail. Agilfage, Albirco, in beak.
Vulpecula.....	The Fox.....	
Anser.....	The Goose.....	
Lacerta Stellio.....	The Lizard	
Cassiopeia.....		Shader, in breast.
Camelopardus.....	The Camelopard	
Serpens, or Ophiuchi....	The Serpent	
Serpentarius, or Ophiuchus		Ras Al Hague, in Head. Yed, in right hand.
Scutum Sobieski.....	Sobieski's Shield	
Aquila, or Vultur Volans	The Eagle.....	Alcair, or Atair, in neck.
Antinous, or Ganymedes		
Delphinus.....	The Dolphin	
Equulus.....	The Little Horse	
Sagitta.....	The Arrow	
Andromeda.....		Caput Andromedæ, in head. Migar, in belt. Almaak, in right foot. [in side.
Perseus.....		Caput Medusæ, (Medusa's Head) = Clufter. Algol, in Caput Medusæ, Algenib,
Pegasus.....		Enif, in nose. Marhab, in shoulder. Scheat Alpherus, in left leg.
Auriga.....	The Charioteer.....	Capella, in the Goat. Hædi, the Kids.
Lynx		
Leo Minor.....	The Lesser Lion	
Triangulum.....	The Triangle	
Triangulum Minus.....	The Little Triangle	
Musca.....	The Fly	

CONSTELLATIONS IN THE ZODIAC.

CONSTELLATIONS	Signs.	ENGLISH NAMES.	PRINCIPAL STARS.
Aries.....	♈	The Ram	[eye] one of the Hyades.
Taurus.....	♉	The Bull.....	Pleiades, a cluster in the neck. Hyades, cluster in face. Aldebaran, (the Bull's
Gemini.....	♊	The Twins.....	Castor and Pollux, in the head of the Twins.
Cancer.....	♋	The Crab.....	Procyon, in back.
Leo.....	♌	The Lion.....	Regulus, or Cor Leonis, heart. Deneb Al Affad, in tail.
Virgo.....	♍	The Virgin.....	Vindemiatrix, in right shoulder. Spica Virginis, wheat in right hand.
Libra.....	♎	The Balance.....	Zuberefchemali, in right scale. Zuberelgenusi, in left scale.
Scorpio.....	♏	The Scorpion.....	Antares, or Cor Scorpæ, heart. Lefath, in tail.
Sagittarius.....	♐	The Archer.....	Nebulosæ, in nose.
Capricornus.....	♑	The Goat.....	Deneb Al Gedi, in tail.
Aquarius.....	♒	The Water-Bearer.....	Scheat, in leg. Fomalhaut, last in the water.
Pisces.....	♓	The Fishes.....	Nodus Celestis, the knot of the ribbon.

These are the Signs of the Zodiac. The six first are called the Northern Signs, and the six last the Southern.

SOUTHERN CONSTELLATIONS.

CONSTELLATIONS.	ENGLISH NAMES.	PRINCIPAL STARS.
Cetus.....	The Whale.....	Menhar, in mouth. Batan Ketus, in side. Deneb Ketus, in tail.
Eridanus.....		Achernar.
Phoenix		
Toucan		
Orion.....		Rigel, in right foot. Bellatrix, in right shoulder. Betelgeuge, in left shoulder.
Monoceros.....	The Unicorn	
Canis Minor.....	The Lesser Dog.....	Procyon, in side.
Apus		
Hydra.....		Alphard, or Cor Hydæ, heart.
Sextans Uranie		
Crater.....	The Cup.....	Alches, in stand.
Cervus.....	The Raven.....	Algorab, in right wing.
Centaurus.....	The Centaur	
Lupus.....	The Wolf	
Ara.....	The Altar [gle	
Triangulum Australe.....	The Southern Trian-	
Pavo.....	The Peacock	
Corona Australis.....	The Southern Crown	
Grus.....	The Crane	
Piscis Australis.....	The Southern Fish	
Lepus.....	The Hare	
Columba Noachi.....	Noah's Dove	
Robur Caroli.....	Charles' oak (Crozier	
Crux.....	The Cross, sometimes	Canopus.
Argo Navis.....	The Ship Argo.....	Argus, (the Dog-Star) in mouth. Ifis, in right ear.
Canis Major.....	The Greater Dog...	
Apis.....	The Bee	
Hirundo.....	The Swallow	
Indus.....	The Indian	
Camelion		
Piscis Volans.....	The Flying Fish	
Xiphias.....	The Sword Fish	

DIALOGUE IV

THE FIRST

THE DESCRIPTION OF THE
HUMAN MIND
IN THE SECOND

AND THE

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HATSOEVER we see, we see it as it is, and not as it appears to be. For the mind is not a mirror, which reflects the objects of sense, but a light, which illuminates them. And as the sun, when it shines, makes all things visible, so the mind, when it is enlightened, makes all things known. And as the sun, when it is obscured by clouds, ceases to give light, so the mind, when it is obscured by passions, ceases to give knowledge. And as the sun, when it is obscured by clouds, is not less the sun, so the mind, when it is obscured by passions, is not less the mind. And as the sun, when it is obscured by clouds, is not less the sun, so the mind, when it is obscured by passions, is not less the mind. And as the sun, when it is obscured by clouds, is not less the sun, so the mind, when it is obscured by passions, is not less the mind.

DIALOGUE IV.

THURSDAY.

On the Succession of Day and
Night, and the Vicissitudes
of the Seasons.

Lady Mary.

WHAT will now be the subject of your instructions, my dear Mentoria? I was so well pleased with your observations on the fixed Stars and the Zodiac, I anticipate much entertainment from the next object you are inclined to explain.

Mentoria. It appears necessary to make some remarks on the regular succession of Day and Night, the vicissitudes of the Seasons, Eclipses,

and Tides, as they are immediately connected with the foregoing observations on the Solar System; though I shall be less copious on those subjects, as by my former instructions, I flatter myself with the hope, you are tolerably well informed respecting those interesting particulars. The revolution of the Earth on its own Axis, produces what is usually called its diurnal motion, which it performs in the space of 24 hours. In the course of this revolving rotation, whilst that part of the Globe we inhabit is turned toward the Sun, we are consequently cheered by his beams, which constitutes our day; in like manner, when the Earth is turned from the Sun, we are involved in darkness, which makes our night, whilst the other Hemisphere enjoys day: thus you will perceive that they are both alternatively enlightened.

Lady Louisa. I clearly comprehend what occasions the regular rotation of day and night; but wish to know by what means morning, and evening, are produced.

Ment. In consequence of the Sun's great magnitude and distance, the rays of light he emits, fall in a parallel direction on the Earth, which invariably illuminates one of her Hemispheres, therefore whilst any place on the Globe
continues

continues in the darkened part, it is night in those regions, but as soon as that place, by the diurnal rotation of the Earth from West to East, approaches to the verge of the enlightened Hemisphere, what is usually called day-break or Morning, appears. In the Earth's rotation on her own Axis also, when the meridian of that place is brought beneath or under the Sun, it is then said to be Noon there and at every other place of the same meridian; in regular progression as this place advances in the Earth's revolution, it again reaches the boundaries of the darkened Hemisphere, which produces the dusky shades of Evening, and in uniform gradation, the return of Night.

Lady L. In our lectures on Geography, I recollect some of the circumstances you have just recited.

Ment. Astronomy may be considered as the counterpart of Geography; as merely being acquainted with the form of the Earth, and the situation of different countries, would be a very imperfect kind of knowledge. When you hear on what part of the Globe any particular place is situated, you become interested, and wish to be informed, whether it is hot or cold, and what allotment of light, and other

comforts, the inhabitants enjoy: these can never be accurately ascertained, unless you are in some degree instructed in Astronomy, which would enable you to calculate what influence the light and heat of the Sun have over it, and give you a clear idea of its temperature, length of day, and natural productions. For example, we will suppose an ignorant person to be in company, and that Greenland, and Guinea, should be the subject of conversation, he would form no conception whether the inhabitants were scorched by heat, or frozen by cold: whilst the well-informed would have a perfect knowledge of the opposite qualities of each respective region.

Lady L. By what means could this knowledge be attained?

Ment. They would recollect that Greenland is in the frigid, and Guinea in the torrid zone. That the former from its remote Northern situation must be intensely cold; and that the latter by being situated between the tropics, where the influence of the Sun is so great, consequently is subject to intense heat. They would also know that beyond the arctic circle, the inhabitants of those regions in Summer, have a progressive portion of day-light, from one month

month to six, and in Winter the same portion of darkness or night. They would also be sensible, that those who reside in the torrid zone, have not days of any considerable length, as the days and nights are uniformly equal in those countries that are situated immediately under the Equinoctial line, and that from that space to the arctic circle, which is the boundary of the Northern frigid zone, there are 24 climates, each of which increase by half an hour in the length of each day, which may be easily calculated with certain precision, and it may be proper to observe the same effects at contrary periods occur, in the Southern frigid zone.

Lady M. I should not wish to live in Guinea, or Greenland.

Ment. Undoubtedly a station between those two extremes is more agreeable; yet I make no doubt, each party are satisfied with their allotment. In the torrid zone Providence has amply supplied the inhabitants with an abundant portion of blessings, to conduce to their comfort, which in a great measure are spontaneous. In some places gold is found in such plenty in the beds of the rivers, it is not necessary to work the mines, which produce that valuable metal.

Lady

Lady L. I think it would be very desirable to live where there is such abundance of gold.

Ment. In an uncivilized country, gold is of itself of no intrinsic value to the native possessors; as it obtains its consequence and worth by being the medium to procure us the necessaries and conveniences of life, which is evident, as in some of the countries where this metal abounds in its genuine state, the ignorant primitive inhabitants were rejoiced to exchange it for glass beads, and other ornaments, and implements of no comparative degree of value. The importance of a possession, depends on the circumstances of our condition; thus to a Savage, who is not skilled in mechanics, an iron hatchet is a more valuable acquisition, than an ingot of gold.

Lady M. I perceive this very forcibly, and do not envy these people their possessions; yet I think they are better provided for than the Greenlanders; as I have often read of the hardships they undergo,

Ment. The great Creator of the universe, has dispensed a degree of provision for all the inhabitants of the Earth, suited to the peculiar state of each region; it is true, each district
does

does not appear to possess an equal portion of those things we consider as essential to happiness; yet the estimation of blessings depends more on the force of habit, than their intrinsic quality. The Greenlanders as inhabitants of the frigid zone, have but few resources in the article of food. Fish, Seals, Sea-fowl, and Rein Deer, form the chief of their subsistence, and their train oil which we could not eat, is esteemed a luxurious addition to their simple repasts.

Lady M. Why are Whales found more frequently in the Northern, than any other Seas?

Ment. They are not peculiar to the Northern frigid zone, as many are found also in the Southern; Providence has wisely ordained that the fish which inhabit the Seas, in the frozen zones, are furnished with a very large portion of fat, or blubber, which by a due preparation, is converted into oil, being thus liberally endued with this unctuous substance, enables Whales, Seals, &c. &c. to subsist where the ocean is frozen, as fat renders animals that are clothed with it in a very great degree not very susceptible of cold: thus you see in this, as in every other instance, the wise Creator of the universe

has

has fitted each creature to its allotted station. I must now close this long digression, and proceed to give you some account of the variations of the Seasons.

Lady M. I expect much entertainment from that subject, and will not interrupt you, except to request you will accept my best thanks for the improvement you have already imparted.

Ment. The seasons which consist of the regular succession of Spring, Summer, Autumn, and Winter, are produced by the Earth's annual motion round the Sun, which not being in the plane of the equator, but in an Orbit inclined to it in an angle of 23 degrees and half, as the Earth turns from West to East. The Spring is the season of the year first to be considered, at this period, in this situation of the Earth, the equator is opposed to the Sun, and in consequence of his always enlightening a Hemisphere or half the surface of the globe, his light by being now equally divided, reaches to both the Poles: therefore from the diurnal revolution of the Earth, the days and nights are equal at all parts.

Lady

Lady M. I recollect your informing me that the sign Aries or the Ram was the vernal or spring equinox.

Men. When the Sun enters the opposite sign Libra or the balance, it produces the same effects respecting the equality of the days and nights, and is hence called the autumnal equinox.

Lady L. I will remember to observe these circumstances when the proper period arrives.

Ment. We must now examine the properties of Summer; in order to give you a clear idea of this season I must observe when the Earth has advanced in its Orbit through Libra, Scorpio, and Sagittarius when it arrives at the first degree of Capricorn, the North Pole is turned to the Sun, and the tropic of Cancer is opposite to him; and as the inclination of the Earth's Axis is 23 degrees and an half, just so far the rays of the Sun reach beyond the North Pole, and in the same degree are defective at the South Pole; consequently the whole of the Arctic circle is enlightened and the Antarctic circle deprived of light: from which it will clearly appear to you that in the Northern Hemisphere it is the longest day which constitutes Summer, and in the Southern half of the
Globe

Globe the shortest day, or Winter; but under the Equator the days and nights are uniformly equal, consisting of twelve hours each, which comprehends the twenty-four hours that is the period of the Earth's rotation on her own Axis.

Lady M. I had not before a clear notion that when it is our Summer the inhabitants of the contrary Hemisphere have Winter.

Ment. This is a natural consequence, as at the period the Earth is proceeding from the sign Libra or the balance, the North Pole is approaching towards the Sun, whilst the Southern Pole recedes from him; therefore the length of the day is increasing in the Northern Hemisphere and declining in the Southern. In the space of three months the scene will be wholly changed, for as the Sun will then be over the Equator, both Poles will again be enlightened by his rays, and the day and night consequently equal in every part of the Globe. The Sun at this season will be rising to the South and setting to the North; this is what is called Autumn.

Lady L. The situation of the Sun and Earth which produces the equality of days and nights in the period you have been describing, I suppose

suppose is what is called the Autumnal Equinox.

Ment. Undoubtedly, and as the Earth advances towards Winter, the South Poles will be turned to the Sun, and the North Pole from him; therefore when the Earth is in the sign Cancer it is Summer in the regions to the south of the Equator at the period when it is our Winter: this you will perceive is occasioned by the Sun's being over the tropic of Capricorn, which is as many degrees south of the Equator as the tropic of Capricorn is to the north of it when the Sun was in our Summer; at this period the Antarctic circle is enlightened and the Arctic obscured in darkness, but under the Equator the days and nights are equal. The Sun continues above the horizon of the south Pole till the vernal Equinox, when he will again rise to the north Pole, and with unceasing regularity fulfil the rotation of the successive seasons.

Lady M. I cannot express how much I admire the variety that we experience in the different effects of the seasons, as they change in annual regularity and order.

Ment. If the Axis of the Earth were perpendicular to the plane of the Earth's Orbit,
the

the days would be invariably of the same length and we should have no diversity of seasons.

Lady M. That would be very agreeable, I should like always to have the seasons like spring or autumn, and the days never shorter: pray what would produce that effect?

Ment. The Sun being over the Equator, which must at all times enlighten both Poles of the Earth, and would make the days and nights constantly equal, as their variation is produced by the inclination of the Earth's Axis and its preserving its parallelism, by which term you are to understand, the Earth keeping its Axis in its natural revolution round the Sun in a position always parallel to itself, which it nearly does. When the Sun is in the first point of Aries, the Earth must be in the beginning of Libra, as that is the opposite sign.

Lady L. How much I pity the inhabitants of the frigid zone, because in winter they have so great a portion of darkness.

Ment. This apparent evil is mitigated by the kind hand of Providence, as even under the Poles when the Sun is not visible to them, they are but a short time involved in absolute darkness; as the twilight continues till the sun is 18 degrees below the horizon, and his greatest depression

depression is but 23 degrees and an half, equal to the inclination of the Earth's Axis. The Moon also is above the horizon of the Poles for about the space of a fortnight, being half her period North and the other South of the Equator; therefore as the Moon at full is in the sign opposite to the Sun, the tropical full Moon must be 24 hours above the horizon at the Polar circles.

Lady M. I cannot sufficiently admire the goodness of God in dispensing such alleviating mercies to the inhabitants of such unfavourable climes.

Ment. These beneficent effects may be traced in every instance: the Sun, which continues longer above the horizon in Summer than in Winter, enlivens our pursuits: but as a counterbalance for the comparatively short portions of his rays that we enjoy in Winter, the Moon at that season continues longer visible to us than in Summer when we stand less in need of her assistance. You will perhaps scarcely believe that in the height of our Summer, we are farther from the Sun than in Winter.

Lady L. How can that possibly be? I must not doubt your assertions, though I cannot imagine

gine as a fact what appears so inconsistent with the evidence of reason.

Ment. This seeming paradox is produced by the days being shorter at that period and the Sun's rays falling in a very oblique direction on the Earth, which are more diffused than they are in Summer when he remains longer above the horizon, and by being higher, transmits his rays in a more distinct manner, by which means the Earth acquires and retains so great a portion of heat that it cannot be subdued or extinguished during the space of a short night, which is occasioned by the Sun being more nearly in a vertical position, and his beams consequently of a denser or thicker quality and not so much weakened by refraction as when they are emitted in a more indirect course as they are in Winter.

Lady. M. I cannot comprehend how this can be proved.

Ment. By observations on the Sun's diameter, which it has been demonstrated is on the shortest day 32 deg. 48 min. and on the longest day 31 deg. 30 min. which ascertains beyond the possibility of a doubt, the proportion of proximity with respect to the Earth.

Lady

Lady L. What portion of the Globe is supposed to feel the heat of the Sun in the greatest degree?

Ment. When the Earth is nearest to the Sun, it is Summer in the Southern Hemisphere; therefore it is reasonable to imagine, the inhabitants of those regions experience a greater degree of heat, than those which are situated in the same degree of latitude in the opposite Hemisphere; to counterbalance this circumstance, their Summer is shorter than ours, by the space of eight days; it is also colder near the Poles in the Southern, than the Northern Hemisphere, which is occasioned by there being more land, which naturally retains the heat, whilst on the contrary the intense cold near both the Poles, in a great measure proceeds from the fields of ice in the Ocean, which even the rays of the Sun in Summer do not wholly dissolve, by the most powerful influence of their genial heat.

Lady M. I seem better acquainted with the Zones, than most parts of your instructions on Astronomy.

Ment. This knowledge you have acquired in your geographical lessons, and I make no doubt that you recollect the Globe is divided
into

into five Zones, or Belts, one Torrid, two Temperate, and two Frigid, appellations which clearly denote their respective qualities. The Equator divides the Globe into two Hemispheres or equal parts, the one Northern and the other Southern ; on this circle the degrees of Longitude are marked, by which you are to understand the distance of any particular place, East or West, from the meridional point ascertained on that map or Globe, which cannot in any instance exceed 180 degrees. The meridian divides the Globe into two Hemispheres, Eastern and Western, on which the degrees of Latitude are placed ; by these the distance of any place is found North or South from the Equator, and as there are 90 degrees from the Equator to each Pole, no place can exceed that number, as you will remember the circumference of the Globe is 360 degrees. The Ecliptic is a certain line that runs through the Zodiac, to shew the Sun's annual path in the Heavens, on which are marked those Constellations, called the Signs of the Zodiac.

Lady M. When I consider the different pleasures we enjoy in every Season, I know not which to prefer.

Ment.

Ment. The seasons all abound with sources of delight and admiration. In Spring we behold the works of Nature unfold by gradual degrees, till they attain the highest perfection of beauty. Vegetation, the Animal world, and the general face of things, inspire a contemplative mind with those lively sensations that afford a kind of rational banquet, where the eye is regaled with varied excellence, the ear charmed with melody, and the intellectual powers kept in perpetual pursuit, by the investigation of the progressive renovating changes peculiarly appropriate to this season. Spring with propriety may be said to be the youth of the year, in which bloom is but the harbinger of the more mature perfection which Summer presents; buds and blossoms become fruits and flowers, and the pleasing expectations formed from vernal fructification, are realized; this luxuriant period may be styled Nature's Meridian, as the Earth at this season is at the height of its splendor, Vegetation in the zenith of its glory, and every surrounding object cheered by the vivid rays of the Sun, which diffuse the blessings of plenty, adorned by resplendent beauty. In Autumn we perceive the ample provision which is wisely ordained for the preserva-

tion and sustenance of every species of animals, as Nature at this season pours forth her richest gifts with a liberal hand in the various means she furnishes for our support and happiness. Winter, which appears at the first view to be a dreary comfortless season, serves the purpose of a kind of repose to all the varied works of the Creation, and produces that variety and contrast which constitutes in a combined sense the genuine beauty of the seasons, or rather manifests the infinite wisdom of their omniscient Creator. In frost, snow, or hail, we may trace certain degrees of beauty and utility, and perceive the beneficial purposes for which they were designed; as the rigour of Winter destroys the pernicious effects which would arise from the exuberance of insects and reptiles that are generated in Summer, and fertilizes the Earth for the approaching productions of Spring: therefore the whole year, as taken in the aggregate, may be regarded as a circle of varied excellence.

Lady L. I never before formed any idea, that each season abounded with so many advantages, as you have enumerated.

Ment. The change of Seasons produces in general no other sensations in the minds of common

common observers, than the habitual ideas that occur, respecting the change of residence and situation which they often produce ; thus for instance, many prefer Winter, as at that period they visit the metropolis, and are engaged in a constant succession of dissipation and luxurious pursuits : whilst others dread its approach, because they live in retired situations, and are in some degree debarred from social intercourse.

Lady M. I think there is no degree of comparison respecting the preference which ought to be given to the situations you have described : I shall not hesitate to determine in favor of Winter, as at that season I see the most company.

Ment. Society is the balm of life, and rational modes of amusement may be enjoyed without deviation from our prescribed line of duty ; yet how frequently do the pursuits of what is delusively called pleasure, produce the contrary effects of disquietude and repentance. Each season points out to the intelligent mind a certain mode of comfort, peculiarly adapted to its circumstances and quality ; such as in Winter, a cheerful fire, social converse, innocent recreations, consisting of those which can occasion no perturbation of mind, or just cause of

blame or regret. Constant employment is the grand specific against what the French call ennui; but we must be ever cautious, that the use of our time should be turned to such objects, as may produce individual advantage, or public benefit.

Lady M. I observe you mention that our amusements should be of a nature to produce no uneasiness or unpleasant consequence; I think there is no danger they ever should.

Ment. Of this there is greater probability than you are aware; as the pursuit of diversion frequently induces persons to engage in schemes, or enter into plans that are inadequate to their finances, or incompatible with the arrangement their situation in life requires; games of chance also, or those that depend on any degree of skill, engage young minds with too great a degree of ardour and anxiety; therefore the object to be won, or lost, should always be of trifling value, as both parties cannot be successful; and though the victor experiences sensations of triumphant pleasure, the vanquished or persons conquered, are subjected to an equal portion of regret.

Lady L. I must confess that I am always pleased when I win, though I do not care for the money.

Ment.

Ment. This is the genuine sentiment, arising from the simplicity and uncorrupted state of your heart ; but intercourse with the world blunts these fine perceptions, and the hope of gain often degenerates into means and measures, not always according with liberality or strict justice.

Lady M. I will zealously guard against the consequences you so forcibly describe ; and I imagine you will recommend a course of reading as our general pursuit in Winter.

Ment. I am rather inclined to a diversity of avocations, as they exercise the various faculties of the mind ; neither am I averse to what is usually called gaiety, when pursued as a relaxation under certain restrictions, and regulated by the rules which good sense and prudence prescribe. The theatre is a source of amusement and improvement, when the subjects chosen for representation, are of a tendency to inspire noble sentiments, by bright examples ; or to exhibit Vice and Folly in their proper colours. Concerts and musical entertainments are not only agreeable and desirable, but may even be turned to excite devout sensations, or to exhilarate the fancy by lively compositions. Dancing is a wholesome exercise, and source of diversion,

and also tends to add grace and dignity to the deportment. Painting and drawing of every species, are an elegant pleasing employ, and when extended to taking views, or copying from Nature, afford an inexhaustible fund of gratification to a mind replete with refined ideas.

Lady L. By pursuing the plan you recommend, I am convinced time will never appear burdensome to me, even in the depth of Winter.

Ment. It is impossible to enumerate the varied objects of pursuit, as they must arise from the circumstances that surround us. Needle work, of the useful and ornamental kind, should engage a portion of your time and attention, as being more particularly a feminine employ, and productive of utility. Exercise is also a means of distributing time with advantage and pleasure, and may be compassed even in Winter, with benefit and delight. But above all I will point out the advantages arising from the study of the most approved authors, and from the conversation of intelligent, well-bred persons; this is not only the means of passing over time agreeably, but with substantial profit; as knowledge is not only confined to books,
but

but may be diffused by various other means; amongst which, none are more forcible than the admonitions, testimonies, or opinions of those we deservedly revere or esteem.

Lady M. I am perfectly satisfied with our allotment in Winter; pray, *Mentoria*, point out of what nature our employ should be in Summer.

Ment. In speaking of our pursuits in different times of the year, we use the general term of Summer and Winter, with which we blend Spring and Autumn, and confine ourselves simply to the distinction of heat or cold, long or short days. In Summer every object takes a wide range; the great portion of day-light we enjoy, and the genial warmth of the Season, conspire to disperse the generality of persons who can pursue their own inclinations. In the higher classes, the greater part retire from the bustle of public or splendid life, and take refuge in the calm retreat of their patrimonial mansions. Others in pursuit of health, or amusement, frequent places on the sea coast; whilst the general mass, who are engaged in commerce and useful avocations, content themselves with occasional excursions, which can

be pursued without material interruption to the regular course of their business.

Lady L. I am always impatient to get into the country, and if it were in my power to chuse, should like some cottage, or rural spot, where I should be more happy than I can express.

Ment. These ideas are the effect of a youthful imagination, which is apt to figure to itself that wild, or romantic scenes would yield a superior degree of satisfaction ; when in fact they would, when the edge of novelty was worn off, produce vacuity and disgust. It is impossible to define by what measures happiness may be most effectually produced ; as much depends on the turn of mind, and the situation of the parties concerned ; yet we may safely venture to affirm, there is the best chance for attaining this desired end, by active, rather than abstracted means. A cottage allows but a small sphere of action, a pastoral life admits but of few variations, the habits are simple, and by constantly preserving the same uniform tenor, enervate, and cramp a mind inherently fraught with laudable curiosity.

Lady M.

Lady M. I have no doubt you would approve the plan of life pursued by our amiable friends Horatio and Amanda.

Ment. Distinguished merit like theirs claims approbation and applause. Their rank in life is high enough to supply them liberally with all that can be styled the blessings of life; and yet not sufficiently elevated, to involve them in the pernicious and disgraceful habitudes, that degrade too many who fill the first classes in society. In summer they reside at their country seat, in which elegance and convenience unite, their grounds are highly cultivated, their gardens are a Botanical school; agriculture also bears a share in this beautiful arrangement, as the whole estate is a *Ferme Ornée*. Horatio is a man of science, and neglects no opportunity to adopt every plan that may prove beneficial to society; his flocks and herds are of the finest quality, his horses of the best breed, and regularly trained, and his carriages of the most elegant and convenient construction.

Lady M. How happy Amanda must be in such a situation!

Ment. In those branches which come immediately under her department, every article approaches nearly to perfection. Her aviary

and poultry, form an assemblage of the most rare and beautiful kinds of fowls and birds; her shrubbery and green-house abound with the most curious plants, which she studies with the most minute attention, and by the most scientific rules. Her house displays the purity of her taste, the furniture being in the style of the most elegant simplicity, and many of the decorations most worthy of applause, executed by her own hand. In the whole of this rational system you perceive neither redundancy nor defect, and the most striking harmony is produced by judicious measures, effected by moderate means of expence. Horatio's and Amanda's method of living, is hospitable and liberal; but as it is uniform, kept within due bounds of prudent oeconomy, by which mode they perform many signal acts of charity, though their fortune is far from being immense.

Lady L. I am always extremely happy when I pay them a visit; there is a library well stored with books, mathematical instruments of all kinds, and every thing that is curious or ingenious.

Ment. These are rational sources of amusement, and when properly recurred to, produce the happiest effects. Society forms a great part
of

of the comforts of this amiable pair, it consists of all the best families in the neighbourhood, by which I mean those most respectable, not always those of the highest rank ; as Horatio does not approve Lord Sceptic's principles, or Sir Richard Squander's profuse habits : neither does Amanda wish to associate, with dissipated Lady Random, nor contemptible Lady Sordid. The time and attention of these worthy members of society are greatly engaged by the education of their children ; as they do not confine their instructions merely to the hours allotted for their lessons, but are always inculcating some important branches of knowledge from every occurrence, and correcting all the errors they perceive, by the most forcible, yet gentle means.

Lady L. Horatio and Amanda are very kind to their servants, and poor neighbours, especially when they are sick ; and have also established a school for indigent children, who are instructed and clothed at their expence. VEQ

Ment. The performance of these essential duties, are the luxuries which I will recommend, as they never cloy ; every evil you mitigate is an exquisite gratification ; to alleviate the pains of sickness, remove the sting of poverty, or plant the seeds of knowledge, by the

application of due remedies and pecuniary relief, places a human character in the brightest point of view : thus you perceive Horatio and Amanda in their Summer residence shed a blessing on all who are within the sphere of their cheering influence. As the means of converting their bright example to your individual benefit, I shall observe, that notwithstanding you cannot wholly adopt their plan, let it impart this useful lesson, that virtue consists in active exertions, and that each season of the year calls us forth to fulfil some important duty ; as even the most minute object teems with instruction, and every dispensation demands the grateful tribute of reverence and admiration !

DIALOGUE

DIALOGUE V.

FRIDAY.

On Eclipses and Tides.

Mentoria.

THE observations I have made on the various qualities of the Solar System would be incomplete, unless I were to enumerate the distinct properties of Eclipses of the Sun and Moon, which you have seen and heard of, but I fear, are ignorant of their natural causes. A Solar Eclipse is produced by the Moon passing between the Earth and the Sun, which hides the light of the Sun from the Earth; this must happen at the New Moon, when the Moon is in conjunction with the Sun. It is called an
annular

annular Eclipse, when the Moon is so situated that its shadow being less than the disk of the Sun, conceals only the centre from our view; the edge of the Sun appearing to surround it like a bright ring. If the whole of the Sun is obscured, the Eclipse is termed total; but if only a part is darkened, it is called a partial Eclipse, and as many twelfth parts as the Moon covers, so many digits are said to be eclipsed.

Lady Louisa. What do you mean by digits?

Ment. The term digit, signifies the twelfth part of the diameter of either the Sun, or Moon, therefore is used to express the degree, in which either are occulted, or darkened. No solar Eclipses are universally seen throughout the whole hemisphere, which is occasioned by the Sun being then above it, the Moon's disk or face being too small, and too near the Earth, to hide the Sun from its disk. Usually the Moon's dark shadow covers only a space on the Earth's surface about 180 miles broad, when the Sun is at the greatest, and the Moon at the least distance; though her partial shadow, or penumbra may at that period, cover a circular portion of 4900 miles in diameter within this space, the Sun is in a greater, or less degree

degree eclipsed; as the places are near, or distant from the centre of the penumbra.

Lady Mary. What is the signification of the word penumbra?

Ment. It implies a faint kind of shadow, on the extremity of the perfect, or complete shadow, which renders it difficult to determine where the shadow begins, or ends. By the observations I have made, I hope you clearly understand that Eclipses are a privation of light, which the inhabitants of the Earth derive from the Sun, or Moon. It most frequently happens in solar Eclipses, that the Moon's disk is covered with a faint light, which is ascribed to the reflection of the light from the illuminated parts of the Earth; in total Eclipses of the Sun, what is called the Moon's limb, (by which is meant the exterior border of her disk) appears surrounded by a pale circle of light, that some astronomers imagine indicates a lunar atmosphere of the Sun. When the Moon appears much less than the Sun, she is said to be in apage, and he in perige; the former term implies the greatest possible distance, the latter the nearest situation any Planet is removed from us. The total occultation of the Sun can never exceed four minutes, and more commonly not
more

more than two minutes, though at some particular place on the Earth an Eclipse may last for more than two hours. A Solar Eclipse does not happen at the same time in all places where it is seen ; but is visible earliest in the Western parts, and later to the Eastern region, occasioned by the shadow of the Moon, as her motion is from West to East.

Lady L. I wish very much to hear what occasions a Lunar Eclipse.

Ment. An Eclipse of the Moon is produced by the Earth passing between the Sun and the Moon, in consequence of which, the latter is deprived of the solar light ; this only happens at the full Moon, as at that period she is opposite to the Sun ; even in a total Eclipse, the Moon is seldom in a perfect state of occultation, or darkness ; which is occasioned by the Sun's rays being refracted in passing through the atmosphere of the Earth.

Lady M. What is the cause the Sun is not eclipsed every New Moon, and the Moon every time she is at the full ?

Ment. Because the Moon's orbit is inclined to the plane of the Ecliptic, therefore an Eclipse can never happen but when the Moon is either in or near one of the Nodes, which are the

two

two points in which the orbit of the Moon cuts the Ecliptic.

Lady L. Do Eclipses appear in every part of the Globe?

Ment. A Lunar Eclipse is visible in all parts of the Earth, which have the Moon above their horizon, and are every where of the same extent and duration; whilst a solar Eclipse varies its appearance at different places. Eclipses of the Moon always begin on her eastern side, whilst those of the Sun commence on his western.

Lady L. How many Eclipses of the Sun and Moon can there possibly be in one year?

Ment. Seven are the greatest number that can happen in that space of time, and two the least that can occur; the most usual number is four, and there are very rarely more than six, one half of which are generally invisible at any particular place; and no Eclipse of the Moon can last above 5 hours and a half from the period of the Moon's first touching the Earth's penumbra, to its departure from it; but an Eclipse of the Moon by the Earth's shadow probably never exceeds 3 hours and three quarters, and when total, is not more than an hour and three quarters. Having thus clearly
specified

specified the interposition of the heavenly bodies which occasion the privation of light, called Eclipses, it only remains for me to remark, that some of the fixed stars are subject to the same consequences ; in particular Aldebaran is frequently obscured by the Moon, when it is behind that Planet, and Jupiter also is in like manner darkened by its brightness being intercepted.

Lady M. I think Eclipses are very extraordinary things ; before their causes were known, I should suppose the inhabitants of the Earth were alarmed at their appearance.

Ment. To have the Sun obscured, or the light of the Moon withheld, for even the shortest space of time, must have excited much astonishment ; but experience in this, as well as in a variety of other instances, supplied the defect of science. The ancients observed these phænomena ; but as they perceived no bad effects, most probably were not apprehensive when they appeared. I recollect a remarkable instance of the sagacious use that Columbus made of the circumstance of knowing from his professional skill, that an Eclipse must at a certain period occur, which serves to shew the very great advantages the learned have over the ignorant

ignorant and uninformed part of the community.

Lady M. I am greatly obliged to you my dear Mentoria; I remember in your instructions on Geography, you informed us Columbus discovered America.

Mont. In the prosecution of that great undertaking, Columbus experienced much trouble from the factious spirit of the officers and men who engaged with him in that hazardous enterprize. At one time a serious mutiny took place, and as Columbus was at that period but a little distance from land, near one of the West India Islands, he obtained articles of sustenance of every kind from the Indians, his own provisions having been either consumed or spoiled. For some time he was amply supplied by the natives, who bartered their food for the alluring bait of a bit of tin, or a few glass beads, and on those who were of a superior class, he bestowed a small looking-glass, a red cap, or a pair of scissors. This traffic was carried on to the mutual satisfaction of both parties, but unfortunately the mutineers who were on shore, prejudiced the Indians against Columbus, and as in those uncivilized countries they cultivate little more than is necessary for their own use, they began to be apprehensive of experiencing
a fear-

■ scarcity ; therefore were very remiss in their supply of food, which greatly distressed Columbus, as his men had been grievously afflicted with severe and dangerous disorders, which are peculiarly incident to hot climates ; a circumstance that rendered fresh provisions absolutely necessary, as the most effectual means of establishing their health. In this critical predicament, Columbus had recourse to the following expedient. From astronomical observations, he knew that in the course of three days there would be an Eclipse of the Moon ; he therefore sent an Indian on shore, who was on board his ship, to inform the inhabitants (whom he convened) that he came to acquaint them of an extraordinary circumstance, in which they were all nearly concerned. That Columbus and his people were Christians, and believed in God, who created Heaven and Earth, rewarded the righteous, and punished the wicked ; that this omnipotent Being was incensed against the Indians for having neglected to supply his people with food, and had determined to punish them by pestilence and famine, in token of which, they would that very night see the Moon rise with an angry and bloody aspect, as a presage of the tremendous evils that would ac-

erue. This prophetic denunciation produced different effects upon the minds of the Indians, some were alarmed, and others treated it with contempt and derision; but when they perceived the Eclipse of the Moon, which took place in the manner expressly foretold, they were unanimous in expressing their consternation and contrition. The consequence of this internal conviction was productive of the happiest effects; as they zealously entreated Columbus, with loud cries and lamentations, to intercede with his God on their behalf, as the means of averting the scourge that threatened them; on which terms they promised in future to supply him amply with every kind of provision he required. Columbus hearkened to their entreaties, yet did not grant their request till the Eclipse began to go off; when after due deliberation, and the appearance of great condescension on his part, he informed them, they might cease to afflict themselves, as he had prayed to God in their favour, who had graciously forgiven them, on condition they would always be kind and hospitable to Christians, and in proof of this gracious pardon, they would perceive the Moon disperse her angry countenance, and resume her former beauty. When they experienced

enced the fulfilment of this pleasing assurance, they praised the God of the Christians, and regarded Columbus as a person peculiarly favoured by heaven; as notwithstanding they had seen Eclipses, it was beyond the compass of their comprehension, to imagine that any one could foretel their appearance, except by divine inspiration.

Lady L. It was fortunate Columbus thought of such a means to prevent the evils he dreaded; but was it strictly right, that he pretended this natural event was a divine judgment?

Ment. Particular circumstances, and exigent cases, require extraordinary means of redress; and in this instance, on the behalf of Columbus, I shall urge that the happy effects his conduct produced, in a great measure plead his excuse, more especially as it served the beneficial purpose of forcibly impressing on these savage Indians an awful idea of the Supreme Being, which perhaps they would not have acquired by any other means. In defining the character of Columbus, we must acknowledge he possessed very superior merit; his skill in navigation was wonderful at that period, his genius enterprizing, and his presence of mind signal,

in all the complicated misfortunes his arduous undertaking unavoidably produced.

Lady M. What do you mean by prefence of mind, my dear Mentoria?

Ment. That powerful impulse, which directs us to pursue in any emergency, those measures that will prove effectual; as persons involved in intricate and apparently inextricable difficulties, if they were to deliberate, would be lost!

Lady L. I think it was very ungrateful of Columbus's officers and men to shew any inclination to rebel, under so great a commander.

Ment. In enterprizes of vast importance, the projectors have many adverse events to contend with. The greater part of the persons who joined Columbus in the prosecution of the expedition he had planned, were actuated by motives of gain, and were impatient under the delay, which in the natural course of things retarded the object they had in view; consequently the principal obstacles he had to encounter, arose from the avarice, ingratitude, and ignorance of his fellow labourers: thus you will perceive the passions were to him more turbulent in their effects, than the Elements. Human nature is the same in every age and nation, the children
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of Israel murmured against Moses for the dangers and inconvenience they experienced in the desert, in their progress to the Land of Promise; and reproached their wise benign leader, with being the cause of all their sufferings.

Lady L. It must have given Columbus great pleasure, to have the Indians pay him such reverence.

Ment. In a variety of instances, recorded in history, we find that the human race, in a state of profound ignorance, are easily wrought upon by any circumstances which bear a supernatural appearance; this gave rise to the absurd, and I may add impious stories, which were impressed on the multitude in the first ages of the world in Pagan countries; as under the sanction of a pretended divine origin, no one presumed to doubt the validity of any assertion or event. Numa, who governed the Romans after Romulus, was a man of consummate wisdom and prudence; and as he was convinced he could not rule peaceably over his subjects, without some superior aid, he pretended to have an intercourse with the Goddess Egeria, whom he apparently consulted in her grotto, on all subjects and matters of importance; thus by imposing on the minds of his subjects this
feigned

feigned sacred authority, he possessed their entire confidence, and much to his honour it may be added, that he was the first who inspired the Romans with an awful sense of the sacred obligation of an oath, which was undoubtedly the foundation of the credit they afterwards obtained; as it rendered them just and honourable in all their proceedings.

Lady L. I am much pleased with the instances you have produced of the superior abilities that Numa and Columbus possessed.

Ment. As I have endeavoured to shew you, the advantage persons invested with power derive from the adoption of wise and prudent measures, the result of a highly cultivated good understanding; as a contrast, I will now point out the contrary effects, by the example of Francis Pizarro, who obtained the conquest of Peru. Various have been the conjectures respecting his origin, some are of opinion he was a nobleman by birth, whilst others (with greater probability) mention, he was the illegitimate son of Gonzalo Pizarro, an officer of Truxillo in Spain, who exposed him as a foundling at the door of a church; from the circumstance of the cheat being discovered, his father was compelled to support him, who bestowed no

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education on him, but employed him in the most servile offices, chiefly in tending his hogs; as this neglected youth advanced in age, he grew weary of this degrading course of life, and as he was of an enterprising spirit, entered on board a ship bound for the West Indies. In this new scene of action, Pizarro so eminently distinguished himself by his bravery, in the wars of Hispaniola and Cuba, that he gained a commission in the Spanish army; after a variety of fortunate events, he became possessed of great riches, and joined with two other adventurers, to undertake the conquest of Peru, in which hazardous attempt he succeeded.

Lady L. I feel quite interested in your account of Pizarro, and am surprised a person so defective in education should achieve such a brilliant victory.

Ment. Personal courage, perseverance, and concurring favourable circumstances, are more effectual in compassing great designs, than mere intellectual possessions, or the genuine effects of regular science; yet when they are added to the other qualities they give an inexpressible degree of consequence to the triumphant Hero: which was manifest in the character of Julius Cæsar, who was an excellent scholar, a gallant

gallant soldier, and in every department, a most accomplished man.

Lady M. Pray Mentoria, now inform us of some striking proofs of Pizarro's ignorance?

Ment. At the time the conquest of Peru was undertaken, there was a contest between two brothers, named Huescar and Atabiliba, for the succession to the Peruvian dominions, on the death of their father. This event proved fortunate for Pizarro, who by artfully seeming to espouse the cause of both these incas, or princes, who were competitors, at length by stratagem, and a kind of fictitious cause of offence, Pizarro imprisoned Atabiliba, and very soon after Huescar was murdered, which in a great measure secured the victory that was afterwards obtained. Atabiliba was a prince endued with great penetration, and as he earnestly wished to procure his liberty, sought to discover the manners, abilities, and customs of the Spaniards, as the best method of enabling him to offer for his ransom those gifts that would be the most acceptable to them. What appeared the most incomprehensible to him, was, their being able to read and write, which he was at a loss to determine, whether they were natural gifts, or acquired by application and labour. As the

means of obtaining this information, he asked one of the Spanish soldiers, if he could write the name of God upon his thumb nail; the man immediately complied with his request; and the inca went to several of the Spanish captains and soldiers, to enquire of them the signification of the word inscribed on his thumb, and by their reply was convinced they understood its meaning, from which he concluded that the art of writing and reading were natural to the whole Spanish nation. This opinion he was soon convinced was erroneous, as by chance he met Pizarro, and asked him the same question respecting the mark on his nail, which the other Spaniards had so readily interpreted; when he from the consciousness of not being able to write or read, blushed and turned away from him with evident signs of confusion, from not being qualified to give a satisfactory answer. This circumstance convinced Atabiliba, that the accomplishments he so greatly admired were the effect of superior education, and inspired him with contempt for Pizarro, whom he now perceived was of a very low origin, since he was exceeded in knowledge by even soldiers of the most inferior rank.

Lady M. I am astonished that Pizarro did not learn to read and write when he was a great man, as it is very disgraceful to be so ignorant.

Ment. Knowledge is very difficult to attain, except in the ductile seasons of infancy or youth; the process of acquiring it is slow and progressive, and must be pursued without intermission, which, when persons are advanced to the mature stages of life, is not easy to effect; as a variety of avocations at that period unavoidably engage their attention. Pizarro's time was I make no doubt wholly employed in the pursuit of riches and power, which he obtained to the full extent of the most sanguine ambition: but to counterbalance these advantages he was subjected to the humiliating mortification of his secretary writing his name as a signature, between two strokes which Pizarro drew, a circumstance that made his ignorance universally known.

Lady M. When persons are so high in rank, it is particularly unfortunate when they are so illiterate.

Ment. In commercial countries, it frequently happens that individuals of low birth, by habits of industry, perseverance, or enterprize,

attain in the regular course of things, great riches, and consequently a proportionable degree of power and consequence. When such persons, by the influence of their wealth and connections, become senators, or associate with the higher circles, they betray their own insufficiency in what the liberal minded esteem the most valuable possessions; as their language is incorrect, and their opinions generally contracted and ill founded: thus you will perceive the inefficacy of riches, which may purchase parade, and state, but cannot deserve the tribute of applause or admiration, unless they are accompanied by intrinsic and superior worth.

Lady L. I recollect that Tides are the next subject of your instructions; I have some knowledge of them, as I spent part of last Summer in a beautiful situation on the sea coast.

Ment. The Tides are produced by the Attraction of the Sun and Moon, and are caused by the flux and reflux of the motion of the vast expanse of the ocean, which is in a perpetual state of agitation, as it ebbs and flows alternately, without intermission. This wonderful effect is more particularly occasioned by the Moon, in consequence of her being much nearer to the Earth than the Sun, therefore her powers

powers of attraction, though inferior, act with greater force, and as a natural consequence, raise the water much higher, which from being a fluid, loses in a great measure its gravitating property.

Lady L. How surprising these circumstances are, and how very few I imagine have a knowledge of their wonderful effects.

Ment. The Moon in passing over any part of the ocean, attracts and raises the water in that particular place, which in the course of about six hours and eleven minutes falls again, and thus invariably rises and falls in little more than the space of twelve hours. The Moon produces the effect of raising the water, not only on that part of the sea over which she is passing, but also on that which is situated in an immediate opposite direction. The effects that the Moon occasions on the water are not perceived till three hours after it has passed the meridian of that place.

Lady L. I imagine the Tides perform their changes with equal uniformity in all parts of the ocean.

Ment. The remarks I have made, more particularly belong to such situations as are open to large oceans; as in seas and channels that are

more confined, many circumstances concur to cause deviations from the rules I have specified ; the effects would be general, if the whole surface of the globe were covered with water ; but the great number of islands and continents interrupt the regular course of Tides in some particular regions.

Lady M. I know that rivers have Tides as well as the ocean, as I have observed them regularly change, when I was at Greenwich.

Ment. All rivers which fall into the sea have a flux and reflux, at some distance from their mouth. I have already explained why the Moon attracts the ocean in a greater degree than the Sun ; the proportion of the attractive powers of the latter, with respect to the Tides, is computed to be four times and a half less than what is produced by the Lunar influence, which effect is caused by the great distance of the Sun from the Earth ; I shall now endeavour to shew you, in what degree the Tides are affected by the concurrent addition of the Sun's force of Attraction. At the time of the new and full Moon, the Sun and Moon, by acting together on the water, raise it to a more considerable height : these elevations are called the Spring Tides ; at the first and last quarters of the

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the Moon, the Sun and Moon act in opposition to each other, and the water in consequence, does not rise so high as under the operation of their mutual attraction: these are called Neap Tides.

Lady L. Are not the Tides later every day for a certain space of time?

Ment. Undoubtedly, as the Earth is revolving on its axis 24 hours, the Moon will be advancing in her orbit; therefore the Earth must turn as much more than round its axis, before the same place, which was under her, can come to the same place again with respect to her, as she has advanced in her orbit; during that space of time, which is 50 minutes, this number being divided by 4, gives 12 minutes and a half; so that it will be 6 hours, 12 minutes and a half from high to low water, and the same portion of time from low to high water again, which make in the whole 12 hours, 25 minutes, from the period of high water to its regular return.

Lady L. The Tides I suppose are of great use, as I have observed when I have been near the sea, or River Thames, how many vessels pass in constant succession.

Ment. Important and numerous are the benefits we derive from the regularity of the Tides. Water in a stagnate state becomes foul, and degenerates into putridity, which is productive of the most baneful and fatal effects ; as the effluvia that arises from it, by its noxious qualities corrupts the air, and consequently produces pestilential diseases. Another essential advantage from the flux and reflux of the Tides, is the means they afford for a wide extended commerce ; as by their variations, vessels of all descriptions and dimensions can proceed from the ocean to the centre of the metropolis, by which channel commodities from all parts of the globe are collected in the great emporium of trade, and from thence diffused by different measures, not only for the general accommodation of this kingdom, but also for the supply of foreign marts. I shall conclude this dissertation on Tides, by observing, that the doctrine respecting them was involved in obscurity, till Sir Isaac Newton removed these doubts and mysteries by the clear demonstration of the power of Gravity and Attraction.

Lady L. Pray Mentoria, explain this matter more fully, as I have a general but not a clear idea of its properties ; particularly I wish

to be informed what the term Gravitation means.

Ment. It signifies the tendency which all bodies have to descend, and the point to which they tend is called the centre of Gravity.

Lady L. This I comprehend, but entreat you will be more explicit on this subject.

Ment. In the Solar system, the Sun is the centre of Gravity; and the centre of the Earth, and of all the other Planets, is a centre of gravity towards which all bodies placed upon their surface are attracted.

Lady L. By what means are you convinced of this?

Ment. The Sun from its superior magnitude attracts the Earth, and other Planetary Orbs of its system, which may all properly be said to gravitate, or have a tendency to approach the Sun as their centre. The Earth, by being of larger dimensions than the Moon, attracts her, and she, as a secondary Planet, gravitates towards the Earth. The Planets are attracted by and also gravitate towards each other. When a stone is thrown from the Earth, its weight or gravitating power attracts it to the Earth again; and by this universal power of Gravitation, we stand upon all parts of the Earth, with our feet

pointing to the centre. The power by which the Planets are attracted towards the Sun, as their centre, is called the Centripetal Force, and that by which they endeavour to fly from it, is termed the Centrifugal Force: thus by the contrary action of these different powers, the Planets are made to move round the Sun, in a circular, or rather in an elliptical Orbit, and it is by the joint action of these opposite forces, that the Planets are retained in their proper Orbits.

Lady M. I wish to know what produces this effect.

Ment. It may be proper to inform you that all motion which is termed simple, is naturally rectilineal, that is, that all bodies, if there were no counteracting power, would move in straight lines, which might be proved in a variety of familiar instances; you will therefore perceive, as the planetary motion is nearly circular, it cannot be called simple, being a compound of the two qualities already specified, which are distinguished by the following terms, the Attractive or Centripetal force, and the Projectile, or Centrifugal force.

Lady L. I am very attentive to these instructions, as they appear to me of great consequence.

sequence, by enabling me to understand the general order of the Planetary system.

Ment. The attraction of the Earth and the resistance of the atmosphere or body of air through which it moves retards its progress or it would continue to move in a straight line with a degree of velocity, equal to that which was first impressed on it. The wise Creator of the universe, has bestowed a force on all the Planets, equal to that of the attractive power of the Sun, that one might not be overpowered by the other, the Attractive or Centripetal force of the Sun, being adequate in proportion to the Projectile, or Centrifugal force of the Planets, which are by Attraction prevented from moving in a straight line, being in a manner driven towards the Sun, and by the Projectile force are hindered from being overcome by the Attractive power, consequently they revolve in circular orbits, though in fact they are rather elliptical in form. All bodies moving in a circle have a natural tendency to fly off in a straight line did not the central force acting against it preserve its circular motion. Before I conclude these remarks upon the general law of Nature, I must mention the remaining branches of Magnetism, Electricity, and what
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is called the Attraction of Cohesion: the two former I shall distinctly consider on some future occasion, but shall briefly inform you that the latter, Attraction of Cohesion, signifies that property that all bodies inherently possess, which tends to unite the different particles of which they are composed, and connects the general system; or they would, uninfluenced by these Attractive powers, be hurled to immense distances, or separated into an infinitude of atoms.

Lady M. Do the rules and consequences you have enumerated respecting the heavenly bodies relate only to the primary Planets, which have the Sun for their centre?

Ment. The secondary Planets are governed by the same laws, in revolving about their Primaries. By the Attractive power of the Sun, joined with the Projectile force of the primary Planets, they are retained in their orbits; so the action of the Primaries, upon their respective secondaries, blended with their projectile force, will preserve them in their proper orbits or spheres; all which, with their Primaries, move round a centre of Gravity, by the universal influence of Attraction.

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Lady L. How very extraordinary it is that the Heavenly Bodies are permitted to move, and are restrained by such wonderful means.

Ment. Every system in the universe is supposed to revolve in like manner round one common centre. In contemplating the order and regularity which prevails in the various works of the Creation, we are led to reflect on the infinite, supreme wisdom, that planned and executed all the wonders which excite our admiration. We ought from hence, also, to derive the useful lesson of an uniform steady performance of the various duties allotted in our sphere of action, as rational Beings; to us, intellectually, God is the centre of all possible perfection, the point to which all our hopes and wishes invariably should tend. Our frailty too often causes us to fly off in a straight direction from our proper orbit, and it is only by the precept, example, and intercession of our blessed Redeemer, that we are enabled to perform our destined course, and ultimately gain the reward of immortal happiness.

DIALOGUE VI.

SATURDAY.

On Light and Darknes.

Mentoria.

IN endeavouring to describe the properties and qualities of Light, I shall also point out the essential benefits which arise from its diffusive genial influence, and deduce those reflections which are naturally suggested in so interesting a discussion. Various have been the conjectures and opinions respecting the nature of Light, which is now demonstrated to be a material substance, flowing directly from the Sun. By the term Light, I mean that certain

tain principle by which objects are made perceptible to our visual organs, after a variety of speculations whether these impressions proceeded from those objects or the eye of the person who viewed them; the discoveries of Sir Isaac Newton have tended to remove these doubts, by establishing a doctrine that may be relied on. According to his system, Light consists of a great number of very small particles thrown off from the luminous body, by an opposing or repulsive power, in all directions, and with an immense degree of velocity, from which it is evident, Light is produced by motion, but as all motion will not produce Light, it follows as a natural consequence, that it depends on the quality of bodies, some of which are inherently luminous, and have the property of emitting particles of Light; of this class are the Sun, Stars, and every sort of flame. The velocity with which these particles move is almost incredible, being computed to be at the rate of near two hundred thousand miles in a second of time, that is near a million times greater in proportion than the rapid movement of a cannon-ball, which is calculated by observations on Eclipses; it has also been demonstrated that the progress of Light from the Sun

to the Earth, is effected in the short space of time of eight minutes and three-quarters, though the distance is 95 millions of miles!

Lady L. My astonishment increases as my knowledge is augmented; how little did I imagine that the Light which is dispensed to us, came by such rapid means.

Ment. The more we know, the more we are convinced there remains to be known than our finite abilities can attain. Persons of profound knowledge may be compared to deep waters, that are clear and genuine in their quality, whilst those that are superficial in their acquirements may be justly said to resemble shallow stagnate pools, which have only a small portion of degenerate loose matter floating on their surface.

Lady L. I hope that similitude will not be verified in me or Lady Mary; my best endeavours shall be used to acquire every branch of valuable information.

Ment. Attention and application will prevent the evil you dread: profit by the advantages you possess; as of all the afflictions incident to human nature those only can be deemed insupportable to which we can attach any self-reproach or blame. As I have already explained

ed the velocity of light, I shall now proceed to inform you that the particles of which it is composed are astonishingly small, even beyond human conception; it is computed that from the flame of a candle in a second of time there fly out ten thousand millions of times more particles of light than there are visible grains of sand in the whole Earth. It is also evident that these particles of light are emitted or sent forth in straight lines, or what is usually called rectilinear motion, which they invariably preserve unless they are turned from their natural course by what is termed Inflection, Refraction, Reflection, or finally, Extinction.

Lady M. Pray my dear Mentoria explain these terms, as they are above my comprehension?

Ment. Inflection means when light is obstructed in its path, by the attraction of some other body, whereby the progress of the ray is hindered from moving in a straight line. Refraction signifies when the rays of light by passing in an oblique direction through any body of a different density or thickness, do not afterwards move in straight lines, but appear broken or bent, and as if they originated from another point. You frequently see these effects,

effects, without knowing their natural cause: thus for instance, a stick when one part is in water and the other in air, seems broken, and that part which is in the water, appears higher than it is in reality. You may also experience the effects of Refraction, by putting a piece of coin, or any other visible thing into a tub or basin, by receding from which, that you can but just see the object, and then by getting a person to fill the tub more than half with water, the money, or whatever you have placed in an experiment, will appear as if it were removed at a greater distance from you. The term Reflection implies, when the rays of light are opposed by some intervening body, which causes them to recede. The last stage of the luminous process, is Extinction, which is occasioned, by the rays of light being stopped in their progress by some body, into which their subtle particles effectually penetrate.

Lady M. What do you mean by a ray of light?

Ment. When a succession of the luminous particles I have just described, follow each other in a right line, they are denominated rays of light. Amidst the various properties of light, none are more extraordinary, than the effect which

Reflection

Reflection and Refraction occasion, particularly in the production of colours; this subject I shall more fully consider, in my observations on the Rainbow, which is an assemblage of the most beautiful tints.

Lady L. I promise myself much pleasure from the description of such a fine object.

Ment. From the observations made on the quality of light, it appears evident, that the Sun is its primary source; therefore it follows as a natural consequence, that from the time of the Sun's rising above our horizon, to his appearing to sink beneath it, we have day, and from his setting to rising again, are involved in darkness, which constitutes night. I cannot mention the Sun rising or setting, without expressing in some degree, the sensations those glorious spectacles exhibit; there is a peculiar quality in solar splendor which causes the imagination to soar beyond the height or depth of human praise, or admiration. Who can behold the gilded horizon and the Sun's glory reflected in the responsive wide expanse of the ocean, and not be awed into a sublime sense of their Supreme Origin? When the Sun emits his beams, and exhilarates every surrounding object, to the contemplative mind, it presents
a striking

■ striking type of the cheering influence of Divine favour, whilst the remission of his rays should impress us with serious apprehension of being excluded from the participation of resplendent immortal glory, in the realms of bliss.

Lady M. From your description of Light, it appears to me very clear, that the Sun, from which it is derived, must be a body of fire; yet you say Dr. Herschel is of a different opinion.

Ment. Some Philosophers have supposed the Sun was a mass of Gold, as that substance can bear fire longer than any other metal. On subjects so far above our comprehension, and that cannot by any possible means be reduced to certain proof, we should be cautious of receiving opinions till there appears almost indubitable grounds for the principles of new theories or speculative systems; those firmly established should be adhered to, till others can be adopted, on a more unquestionable and durable basis; though all persons zealous to make useful discoveries are entitled to applause, and claim our attention. Some ingenious observations have been made on the properties of light and heat, by many
modern

modern philosophers. Dr. Fordyce asserts that the Sun has probably no inherent heat, and that the Solar rays are not in themselves of a hot quality, but only possess the power of producing heat in other bodies. These sentiments very nearly coincide with those advanced by Dr. Herschel, who is of opinion, from observations he has made on the Sun and Fixed Stars, that they are all most probably inhabited.

Lady M. That would be impossible if the Sun were a body of fire.

Ment. On subjects of such importance we are incompetent judges, therefore must not be hasty in our decisions. For the sake of the argument we will consider the Sun as a spherical body of fire, and yet consistent with our ideas of the omnipotence of the Supreme Being, may acknowledge not only the possibility but the probability of its being inhabited, as that creative power which constructed fishes to live in water, animals on the earth, and birds and insects in the air, might also form beings suited to the only remaining element, fire. Existence is derived from the power of respiration, being congenial to the state and condition of each individual; therefore God could even in this instance deprive fire of its consuming quality, or
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render those who lived in immediate contact with it, not sensible of its force: a remarkable proof of which we find in the miraculous preservation of Shadrach, Meshach, and Abed-nego, who were cast into a fiery furnace by the command of Nebuchadnezzar and were not even scorched by the flames.

Lady L. I am fully convinced that all things are possible with God, and acknowledge my own folly and presumption in an attempt to doubt what he wills to perform.

Ment. Those opinions, which are formed on the immutable foundations of just principles and divine truth, never fail to produce the most lasting conviction. As the means of strengthening these right impressions, I shall add a few remarks on the various dispensations respecting animal life, which experience has proved beyond controversy or doubt. In the first instance, I shall produce the example of the structure of fishes, many of which subsist at the bottom of the ocean. In this situation you would imagine they could not exist, but it is wisely decreed by Providence that most fishes have a bladder or bag of air, which they are enabled to enlarge or contract, and by that means to rise or sink, as best suits their purpose: their gills also act as
a kind

a kind of lungs and admit air, with particles of which water abounds. The next instance I shall specify, are those kind of animals which exist by burrowing in the earth, often far beneath its surface, and in a situation remote from the aperture they have formed for their entrance into their subterranean recesses. Another species of extraordinary existence is those classes of animals that are absorbed in a torpid state during the whole winter, and in that interval of somnient repose, take no sustenance, but are alone supported by the peculiar temperature of their blood, and the degree of fat with which they are clothed. These unquestionable facts ought to repress our distrust of Supreme Power, and extend our credulity to the utmost bounds in all matters relative to his Divine appointments and universal influence: therefore if the Sun and Fixed Stars are inhabited, as well as the infinitude of Planetary Orbs which form their systems, there cannot remain a doubt they have a just proportion of all the blessings we enjoy as terrestrial inhabitants, as they are equally dependant on, and supported by an Omnipotent and Omniscient Deity.

Lady M. Your reflections on these subjects I feel very forcibly; accept, my dear Mentoria,

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my beſt thanks for your zealous endeavours to improve us.

Ment. The nature of the ſubject has cauſed me to digreſs beyond the intent I had originally formed. I muſt therefore now reſume my obſervations on the influence of Light, to which I ſhall oppoſe the contrary effects of its privation.

Lady L. Light is ſo agreeable, I am almoſt inclined to wiſh that we were never deprived of it.

Ment. Like many other bleſſings, the value of it is enanced by the conſtrast which Darkneſs or Night affords. Light appears to be the ſource of every intellectual enjoyment, whether natural or artificial; it is the means of enlivening our perceptions and impreſſing permanent ideas of viſible objects which could not be obtained but through that medium. For inſtance, if we were to hear the ſplendor of the Sun's reſplendent beams deſcribed by the moſt eloquent orator, we ſhould form a very imperfect idea of its irradiate glory. If the moſt elaborate pains were taken to expreſs the varied beauties of the creation, nothing but ocular demonſtration could impreſs us with juſt conceptions of the Deity, which muſt be derived from the conviction

tion we have of his infinite attributes in the works of the creation, which combined or separate, are deserved objects of admiration, and just claimants of our gratitude and praise.

Lady L. I clearly perceive the benefit of Light, but cannot so easily discern the advantages of Darknefs.

Ment. Darknefs, or the kind of light which the brightest night affords, seems admirably suited to the purposes of repose. Animal spirits require a suspension of the exertions and avocations to which, in a variety of cases, they are exposed. The ploughman who is employed in the most laborious offices of agriculture, or the philosopher who is engaged in the most profound and ingenious researches, equally stand in need of refreshment from sleep, to which the stillness and darkness of night most beneficially conduce. In Summer vegetation also is cherished by the same salubrious means, dew operating the same on the productions of the Earth, as sleep does on animals of every kind, by shedding a kind of renovating recruit; by which one attains a supply of strength and spirits, the other of freshness and growth.

Lady M. I will never again wish that there was no night, as I find it is attended with such beneficial effects.

Ment. As animals, we may be compared to machines, or wonderful pieces of mechanism, composed of various springs and movements, compacted and constructed with consummate skill; if these powers were always on the stretch, they would prove but of very short duration. Exercise and rest are the hinges (if I may be allowed the expression) on which our temporal existence depend; this may be considered mentally as well as corporeally, as intense application cannot be pursued without intermission, any more than the constant motion of the body can be effected without sustaining a material injury. Thus you will perceive it is by the due accordance of Light and shade, exertion and repose, that the whole œconomy or system of Nature is sustained, and our enjoyments rendered substantial and permanent.

Lady L. If Light is so essential to happiness, how miserable those persons must be who are blind!

Ment. I am convinced that is very far from being the case, which I can assert from experience, by examples of some persons with whom
I have

I have been in habits of intimacy. If they are blind from their birth, they are not sensible of the loss they sustain by the privation of sight, and in general they have that defect supplied, by possessing a taste for music, and are endowed with a remarkable just conception of sound, and by touching an object can judge of its quality ; they are also frequently blessed with fine perceptions, which are not dissipated by the succession of external objects, therefore are very often intellectually enlightened in an eminent degree, though in other respects involved in darkness. It is remarkable, that persons who are deprived of sight are uncommonly cheerful ; and when this blindness is the effect of disease in the optic organs at a mature period of life, by the recollection they have of objects, can give their opinion with the most accurate propriety ; and from their ideas in a manner being concentrated, are intelligent, agreeable companions.

Lady L. In future I will not pity persons who are blind, since I find their situation less melancholy than I imagined.

Ment. That is not the effect I wish to produce ; I have only endeavoured to shew you, on the system of the general dispensation of

blessings, that persons deprived of sight, are not destitute of comforts ; though undoubtedly they are objects that excite commiseration, by being not susceptible of the cheering influence of Light, which our visual powers receive in a variety of pleasing forms. In the lower classes of life, where a subsistence is to be gained, they peculiarly demand our pity and assistance ; as persons destitute of sight, notwithstanding by some extraordinary means they may gain a maintenance, those instances are comparatively rare, and in general they have so many obstacles to encounter, and such great difficulties to surmount, they seem to have a superior claim to the most munificent effects of public charity and private pecuniary relief. On this subject I will only add, that it is my earnest wish, when any opportunity offers for you to realize those benevolent lessons I so strenuously inculcate ; that you will pursue the means your sympathetic feelings suggest, by giving liberally to the afflicted, and with heart-felt satisfaction proportion your gifts to the seeming necessities of the object who claims your assistance.

Lady M. I will readily obey your injunctions on this subject, and am certain Lady Louisa will unite with me in relieving the blind,
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and every other description of afflicted persons, as acts of charity are productive of the highest satisfaction.

Ment. It is worthy of observation that two of the greatest geniuses who have produced harmony of the most exquisite kind, in poetry and music, were both blind; it is almost needless to add, that I mean Milton and Handel, and it is highly probable their imagination would not have soared to such heights of excellence, if their visual organs had been able to contemplate external ostensible objects; so that their misfortunes, perhaps, proved the means of rendering their fame immortal.

Lady M. I shall admire the works of Milton and Handel more than ever, now I have heard they were both afflicted by the loss of sight.

Ment. Excellence of every species demands our applause; but that superior kind which arises from such extraordinary instances of perfection in any Art or Science, as what this great poet and musician attained, is of a nature to excite our admiration to almost an enthusiastic pitch. As these eminent persons are equally distinguished by the sublimity of their respective compositions, they may not unaptly be com-

pared to the Planets, which from being dark, or opaque, transmit the light of the Sun by the powers of reflection; and with justice their bright genius may bear some degree of similitude to that glorious luminary, as their effects are of the most brilliant quality, and must, from their superior lustre, be derived from a Divine source!

DIALOGUE

DIALOGUE VII.

MONDAY.

On Air, the Atmosphere, and
Sound.

Mentoria.

AS I flatter myself with the hope that you have now a just conception of the Celestial Bodies, I shall zealously aim to instruct you in some important branches of Natural Philosophy, as they appear collaterally connected with my Lectures on Astronomy. After having explored the wonders of the Firmament, it becomes in some degree necessary to examine the quality of that thin transparent fluid body, denominated Air, which surrounds the Terra-

queous Globe we inhabit, and covers it to a very considerable height. In the definition of this fluid mass, if we include the constituent parts of air, watery, and other vapours, electric matter, &c. which encompass the whole Earth, and participate of its motions, we call it the Atmosphere, as a general term.

Lady M. I recollect hearing you frequently mention the Atmosphere; pray, my dear Mentoria, be kind enough to explain what it is?

Ment. The Atmosphere is a body of Air, consisting of aqueous vapour, blended with a mixture of heterogeneous particles, exhaled from all solid and fluid substances on the surface of the Earth: this compound ethereal matter surrounds the Globe, through which the Sun's rays pass before they reach it; in their progress they do not move in straight lines, except when the Sun is at the zenith, or directly over our heads; but when they reach our Atmosphere they bend downwards, which produces what is called Crepusculum or Twilight. The rays of light pointing upwards from the Sun before he rises, and after he has set, bend towards the Earth upon reaching the Atmosphere; and in consequence it begins to be light in the morning when the Sun arrives at 18 degrees below the Eastern

Eastern horizon, and continues to be light in the evening till he has sunk 18 degrees below the Western horizon.

Lady L. What do you mean by the rays of light bending downward?

Ment. This is produced by Refraction, and is caused by their passing in an oblique direction from one medium to another, as from Air into water, or water into Air. As I explained this matter very explicitly in my definition of Light, I shall say no more on that subject at present.

Lady L. Pray Mentoria inform us of all the properties comprised in the Atmosphere.

Ment. It is a thin invisible fluid, more dense or heavy near the Earth, but gradually is of a lighter quality the higher we ascend; therefore at the summit of some high mountains it is scarcely possible to breathe. The Atmosphere serves not only to suspend the clouds, to supply us with wind and rain, but to furnish us with the means of respiration; it also produces the morning and evening twilight, as I have just described. This body of Air, which is termed the Atmosphere, is about 45 miles above the surface of the Earth, therefore the Sun's rays falling upon the higher parts of it before rising, by Reflection causes a faint light,

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which increafes till he appears above the horizon, and in the evening it decreafes, till he is 18 degrees below the horizon, when the morning twilight begins, and the evening twilight ends.

Lady M. I never before thought by what means I breathed, or what produced Light, Rain, or Wind.

Ment. It is a common but much to be lamented proof of human frailty, that we frequently enjoy bleffings, without being able phyfically to account for them.

Lady L. What do you mean by the term Phyfically? that expreffion feems to relate to Medicine.

Ment. Its more extenfive fignification implies any thing that can be accounted for by natural caufes, fuch as the various branches of Philofophical inquiry; but all matters beyond the power of human ability to folve or demonftrate, are faid to be Metaphyfical, a term particularly appropriate to Divine fubjects. The Atmosphere is the fource of almoft every terreftrial comfort we enjoy; it is the medium through which we obtain the light of the Sun, the refreshing falubrious breezes of the Air, vegetation, and every relative and combined effect effential

essential to existence. In proportion to the quality of the Atmosphere that surrounds us, we are said to be in a good or bad temperature; Air is the vital principle of life, and our lungs the organs of respiration, by which such a portion is imbibed as is necessary for the recruit of the animal spirits, and the support of our general stamina.

Lady L. I had no idea of the beneficial consequences of the Atmosphere.

Ment. When you perceive the day appear bright, and the prospect our horizon affords clearly visible, you may then be convinced the Atmosphere enables you to discern these pleasing objects; as if there were no Atmosphere, the Sun would yield us no light but when our eyes were directed toward him, and the heavens would appear dark, and as full of stars as on a dreary winter's night; but the Atmosphere, by being strongly illuminated by the Sun, reflects the light back upon us, and causes the whole heavens to shine with so much splendor, that the faint light of the Stars is obscured, and by that means rendered invisible.

Lady M. I am very happy that I am now convinced of the advantages we derive from the body of Air that surrounds the Earth; I am
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thankful for every fresh branch of knowledge I acquire.

Ment. Learning (which is a perverted term, unless expressive of useful information) is the greatest treasure that you can possess. Riches may diminish, but knowledge cannot fail to increase, provided you use the natural means that we are all endowed with, to acquire this desirable possession. The ignorant pass through life as it were blind-folded; as they observe nothing beyond the common perceptions of their natural sense; therefore wonder on subjects that are plain and simple in their effects; and from their few resources of information, are not sensible of the great advantages that are derived from a highly cultivated understanding, which like the diamond, ever shines with resplendent lustre.

Lady L. I hope you have not finished your account of the different qualities and effects of Air.

Ment. As I have already specified the various advantages we derive from the Atmosphere, as being essentially necessary to existence and the production of vegetation, it may be proper to add those of Sound, Rain, and Dew. Air differs from other fluids in the following instances. It is capable of being compressed into a much
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less space than what it naturally possesses; it is of a different thickness or density in every part upward from the surface of the Earth, decreasing in its weight in equal proportions, the higher it rises, and consequently must decrease in density; it is also of an elastic nature, and the effect of this springy quality is proportionate to the force by which it is compressed; and the elasticity of the air is increased by heat, and diminished by cold.

Lady L. I have heard persons frequently mention the weight of the Air, but I did not know their cause for so doing.

Ment. Most probably their observations arose from their perception of the dense quality of the surrounding Air, unconnected with the philosophical grounds they had for that assertion. The variations in the weight of the Air, arise in a great degree from the different portions of heat which are in the ethereal fluid near the surface of the Earth; and also from the changes in the Atmosphere, caused by the vicissitudes of winds and vapours. It is computed there is a pressure of Air equal to 15 pounds avoirdupois weight, upon every square inch; therefore it is calculated that a human being of full sized dimensions

mentions sustains the astonishing burthen of 21,600 pounds.

Lady M. I am amazed they are not crushed by such an immense load.

Ment. Great as that pressure is, the divine will and power could increase it to any degree his providence ordained ; however we may safely rely that the density of the atmosphere like the revolutions of the Celestial Bodies and every other part of the Universe is directed in its operations by Supreme Wisdom.

Lady L. I fear you have compleated your dissertation on Air, which I greatly regret.

Ment. As far as relates to its genuine state when not subject to motion, though there remains a very essential branch for me to discuss, which comprises the variations its agitations produce in what are usually called the wind, which is in effect a stream of air that proceeds from one region to another. In some parts of the torrid zone there are regular winds which blow invariably from the same point, these are called trade-winds and are of great utility, as ships when they attain to a certain degree of latitude and longitude are sure of having prosperous gales : there are also some particular parts between the tropics, where the winds blow periodically

riodically for the space of six months in one course and six months in the contrary direction, those are called monsoons ; these and other respective variations are exemplified on the globe by arrows pointing different ways, which I intreat you will observe with great attention, I therefore will be the more concise in my remarks on that subject. Winds are more uniform in their course on the sea than on the land, which is occasioned by the temperature of the latter being affected by the influence of electricity, volcanoes, exhalations and meteors. It is also observed that the East wind and those which come from the Poles are stronger than the West and those which proceed from the Equator ; whilst on the contrary, the West and South winds are more or less violent than the East or North winds. Winds are more tremendous in their effects in mountainous situations than in plains ; and the higher we go the greater we experience the force of the wind, till we attain the common height of the clouds, which is nearly one quarter of a league perpendicular height, beyond which the sky is generally serene, more particularly in the Summer season, and the wind imperceptible even on the summit of mountains. In continental countries the winds are not only variable but produce extraordinary

nary effects, such as the heat of Summer being experienced on one side of a mountain and the rigour of Winter on the other. During the Summer season in Egypt hot Southern winds are very prevalent, which suspend the breath and raise such a quantity of sand of a quality so fine and subtle it penetrates into every object, and often causes pestilential diseases. The most tremendous effect of wind is what is usually called hurricanes, in which the wind seems to proceed from all directions and produces a whirling kind of irresistible motion that is inexpressibly awful and fatal in its effects; a calm generally precedes these dreadful tempests. Whirlwinds are produced by the conflicts of sudden rarefaction when contrary currents of air meet in the same place. I have been thus particular on this subject as it must frequently occur in common discourse, and you are no doubt informed the four cardinal or chief points the wind blows from are North, South, East and West; therefore the quality of the weather naturally in a great measure depends, from which of those the current of air proceeds. I must now endeavour to give you some idea of the properties of Sound.

Lady

Lady L. I think that will not be very difficult, as we are all sensible of its effects.

Ment. But I am doubtful whether you know by what cause they are produced. Sound is the natural consequence caused by an agitation of the air, arising from the tremulous motion of the parts of any sonorous body when struck upon, which by occasioning the air around it to vibrate to a certain distance, conveys the Sound to the ear that is within the reach of that vibration: and various experiments which have been made on the air-pump clearly demonstrate that Sound cannot be produced without air, as on the motion of its particles it entirely depends. It is by this elastic force that Sounds are conveyed to the organ of hearing, which is wonderfully constructed not only to receive the impression but to convey it to the brain which is the seat of perception, and from the concurrent operations of these extraordinary instances of divine skill, we are susceptible of a variety of sensations arising from the influence of Sound. In the variations and proportions these act upon our feelings, they are said to be pleasing or painful in their effects, as a certain degree of harmony or coincidence is necessary to render them accordant to our sensitive perceptions. Music

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is unquestionably the most refined and distinguished effect of the property of Sound, and by its influence on the passions, and intellectual powers, may be considered to comprize the general œconomy of the doctrine of Sound.

Lady L. I am extremely delighted with music of every kind, and shall in future pay great attention to the different kinds I hear.

Ment. - Music from its general pleasing effects, is a science almost universally admired, and very frequently persons acquire a great degree of perfection in the practical parts; most of whom I make no doubt are ignorant, that the different Sounds produced by different instruments, are occasioned by their peculiar construction, and the natural consequence of the properties of air, which tend to constitute those variations of tones, which are comprehended in the compound term, of Music.

Lady L. It is surprising at what distance one can perceive any noise.

Ment. Sound moves at the rate of 68,520 feet in the space of a minute; or 1142 feet in a second or moment: this computation will enable you in some measure to account for the distant perception of Sound; as the rapidity with which it is conveyed to our auricular organs,

gans, is with a degree of velocity almost beyond the powers of our comprehension: thus you perceive, that even what you hear, comes through a medium, and by a means which cannot fail to excite your wonder and admiration. There yet remains a curious Phænomenon respecting Sounds, which I will briefly explain: you have frequently heard an Echo, this like many natural causes is commonly perceived, though but rarely traced to its original cause. An echo is produced by the vibrating air being obstructed in its passage. The undulating motion of the air, in its progressive course frequently meets with repellant objects, and by striking against them is reflected back to us, and occasions new vibrations, which if the object is in a proper situation, repeats the same word or sound first formed, and this sometimes not only once, but by several distinct repetitions.

Lady L. We are much obliged to you, my dear Mentoria, for giving us a just notion of an echo; there are some places in our park, and gardens, which produce that Phænomenon.

Ment. You will now be convinced this constant effect arises from some permanent obstruc-

obstruction of the current of Sound, which causes it to return to you the very word or tone you uttered. As I have enumerated the general effects of Air, I shall now endeavour to subjoin some apposite reflections on its universal beneficial qualities. Air like every other species of matter, is expanded by an increase of fire, or heat, blended with its particles, in which state it is said to be rarefied. As a proof of its elasticity, the greatest degree of cold is never able to destroy its springy quality, as the particles of which Air are composed are subject, like every other species of matter to the laws of gravitation, they are expanded by a decrease of its general mass or quantity.

Lady L. Pray my dear Mentoria do not conclude your remarks on Air.

Ment. I will extend them so far as to shew you that Air, not only contributes to produce animal, and every other degree of heat necessary to existence, but also what is called combustion, by which you are to understand any body or substance that may be burned or destroyed by conflagration. Air may properly be said to be the fuel of fire, as by combining with combustible matters, the Air is condensed or destroyed by the fire being emitted, which
kept

kept it in a state of elasticity. Every animal is possessed of some means of aspiration or breathing, by which they can acquire as much Air as is proportioned to their construction, and other relative circumstances of existence. The greater part have lungs, and others that have not, have that defect supplied by a kind of bladder, by which such a portion of Air is imbibed, as serves the purpose of supporting animal life; most insects are endued with a kind of tube, which serves as a substitute for lungs, and enables them to gain as much Air as their state and condition requires. It is not alone to the animal part of the Creation, that the dispensing hand of Providence has been so diffusive in its blessings, as vegetables are also furnished with tubes or pipes, by which they receive such a portion of Air, as not only tends to their existence, but their growth; this is not merely effected by the fibrous parts of the roots, but also by those which are situated on the leaves, as Air constitutes an essential part of vegetative preservation.

Lady M. I am almost ashamed, when I reflect, that I have breathed without being sensible of the importance of Air, and have seen all the effects

effects you describe, perfectly unconscious of their important uses, and divine source.

Ment. In your case, there is neither cause for regret, nor reproach. Youth is the period of life, in which information is to be gained; we cannot be wise by intuition, Instruction is the general medium by which you are to obtain knowledge, and observation and experience are the auxiliaries that tend to complete the great end of essential Improvement. Education operates on the mind, as Air does on the body; it expands, it animates, and vitally fertilizes the whole intellectual system.

DIALOGUE VIII.

TUESDAY.

On Electricity and Magnetism.

Lady Louisa.

YOU have explained many very surprising things to us; pray my dear Mentoria give me some idea of Electricity?

Ment. Electricity is that peculiar quality which some bodies possess, that after having been rubbed, and by that friction heated to a certain degree, acquire a power of attracting and repelling other bodies, and frequently of emitting sparks of fire. All such bodies have this inherent quality, and require only a certain degree of friction to excite it, are called Electrics,

and all those which have not this property, and can only receive it by communication with electrified bodies, are denominated Non-Electrics. Thales, the Milesian, was the first who discovered the electrical properties of amber, by attracting light bodies when it was rubbed, about 600 years before the Christian æra; and nearly at the period of 300 years previous to that epocha, Theophrastus observed that the Lyncurium, a substance now called Tourmalin, had the same attractive property. From this period to the 17th century, this branch of Philosophy appears to have been neglected, excepting that Mr. Bose discovered that Jet and Agate were possessed of electric properties. About the year 1600, Dr. Gilbert, by various observations, extended the discoveries respecting the variety of other electric bodies. In the year 1670, Mr. Boyle greatly enlarged and improved the Science of Electricity; but to Sir Isaac Newton, who flourished at the close of the 17th century, we are indebted for many valuable discoveries, who ascertained that the electric attraction and repulsion penetrated through glass. After this period a variety of modern philosophers have made great improvements in this part of Natural Philosophy.

Lady M. How frequently you mention Thales and Sir Isaac Newton as being the cause of great discoveries in science; how very superior their merit must have been!

Ment. They were both signally distinguished by their learning and abilities. Thales was one of the seven wise men of Greece, and Sir Isaac Newton one of the most brilliant geniuses that this, or perhaps any other country ever produced. I must now recal your attention to the properties of Electricity, which are to attract or repel all kinds of very light bodies at a sensible distance, when the attracting body is heated by friction, which is in effect nothing more than the attraction of Cohesion, excited by a strong attrition to act with less force in a larger sphere, such as amber, jet, sealing-wax, glass, &c. It will be beyond my purpose to enumerate each substance endued with this property, I shall therefore briefly divide them into the following classes: metals, such as gold, lead, copper, iron, steel. Animal substances, bones, shells, hair, &c. &c. Vegetable substances in infinite variety. Corallines, or marine productions of sponge, coral, &c. &c. Fossils and mineral substances, and, lastly, artificial substances,

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namely,

namely, china-ware, glass, elastic gum, silk, &c. &c.

Lady L. By what means are these effects produced?

Ment. The electric property in some instances may be proved by the simple process of friction, though its philosophical systematic uses are ascertained by an ingenious apparatus, called a machine. The principal parts of these electrical machines are the Electric, the Moving Engine, and the Prime Conductor; these curious pieces of mechanism consist of globes, spheroids, cylinders, wheels, &c. so constructed as to produce the effect of Electricity. Their various forms and qualities would carry me beyond my present purpose; I shall therefore only mention, that formerly a variety of substances were used as Electrics in these machines; but at present smooth glass globes are very generally adopted.

Lady M. I have heard of many of our friends being electrified; what advantages did they derive from it?

Ment. We are composed of the Elements, Earth, Air, Fire and Water, which are our component or constituent parts.

Lady

Lady L. I cannot comprehend this matter; pray my dear Mentoria be more explicit on that subject.

Ment. Our corporeal frame is comprised of solids, and fluids; the solids are evidently Earth, as in the Scriptures we are expressly told, dust we are, and unto dust we shall return. The fluids, which consist of blood, and other juices, have a great proportion of water in their compound; and it is evident that breath which is the chief principle of existence is derived from Air; therefore there only remains to prove that we possess also a portion of Fire, as well as of the other Elements blended in our composition, which Electricity demonstrates beyond a doubt.

Lady M. I can scarcely believe we have Fire in our composition.

Ment. This quality is philosophically termed animal heat, by which is to be understood that principle, which is produced by the agitation of the body, and the fire contained in it, which excites the idea of heat in our minds, and in the body thus heated, is merely the effect of motion. Various are the opinions respecting animal heat, though it appears most probable, that the absolute heat, which is separated in respiration, and absorbed by the blood,

is the genuine cause of the portion of this elementary fluid, which is dispersed through our general mass, and almost in every other composition: namely in plants, in most species of trees, the bones, flesh, and blood of animals, which is evident from their combustible quality when dried; also in minerals and a variety of other things. In this instance, there is peculiar cause for gratitude, that this active fluid fire which is incorporated in our frame, is kept in due bounds respecting its operation, by the effects of Divine wisdom. I hope you are now convinced you are composed of the Elements, which is a term expressive of the original simple or unmixed parts of any body, or that to which it is ultimately resolvable.

Lady M. I recollect seeing a lady electrified, and it seemed to be a very ingenious apparatus that was used to produce that effect; in what respect could it prove beneficial to her health, as she was in an invalid state?

Ment. This branch of Philosophy, which is converted to medical purposes with great success, has been brought to a surprising degree of perfection. In paralytic, and other cases that require a stimulus, Electricity often produces the happiest effects; but like all other remedies
powerful

powerful in their operations, they should not be adopted, but by the advice and under the immediate direction of the most skilful practitioners.

Lady M. I heard once of a person receiving such a shock by touching some electric power, that it had nearly proved fatal.

Ment. The consequences of the electric force in many instances have been tremendous : a very melancholy accident happened in 1753 to professor Richman at Petersburg, as he was making experiments on lightning, which he had drawn into his chamber for the purpose of ascertaining its electric qualities ; when dreadful to relate, just as he was going to prove philosophically the proportion of electric fire, a ball of fire issued from the lightning, struck him dead, and consumed and destroyed most of the things in the room.

Lady M. How much the death of such an ingenious man is to be lamented, particularly as he was seeking to gain fresh knowledge.

Ment. Persons who die in such a glorious cause may be considered as martyrs to the general good of mankind. I recollect an instance equally unfortunate, and in many respects similar, in the death of the elder Pliny who lost his

life by his determined resolution to observe the effects of the dreadful eruption of Mount Vesuvius which happened A. D. 79. He was in vain advised to recede from the danger that threatened him, by exploring this tremendous object too nearly. As Pliny had at this awful season a fleet of ships under his command, he ordered the galleys to put to sea, with the hope of rendering service to his friends on the coast, as well as to satisfy his laudable philosophical curiosity. After various difficulties he at length determined to go on shore to his friend Pomponianus at Stabia, in the gulf of Naples, observing when he debarked, " Fortune befriends the brave." In the extremity of distress this eruption caused, by the fire, smoke, and cinders that issued from it, the people were involved in inextricable danger; therefore, whilst on the shore deliberating whether to go on board his ship again, this great man was suffocated, as it was imagined, by some noxious vapour from the eruptive matter.

Lady L. I feel much regret that two such eminent men should have fallen sacrifices to their eager pursuit of science.

Ment. To die is the common lot of human nature, but to expire heroically is the fate only
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of persons of distinguished bravery and magnanimity of soul. A sense of danger will never operate to retard a truly great mind from engaging in any noble enterprize, as Glory is more valuable than life!

Lady M. The melancholy fate of Professor Richman will make me fearful of being electrified, if ever that remedy should be advised for my benefit.

Ment. You might with as much propriety never eat any grapes, as the Grecian poet Anacreon was choked by swallowing that fruit; and a number of cases might be adduced, that would excite dread on every subject, if those sensations were not counteracted by trust and implicit confidence in Divine protection. To quell your fears on this occasion, I can safely assert that a judicious operator in Electricity, possesses the skill of proportioning the degree of the shock produced by the electric quality, to the circumstances of the case; and by that means even the eye, which is of a most delicate texture, can receive a slight touch of its force, which is often productive of the greatest advantage. This like many other things is possessed of great utility when properly applied, but destructive when perverted or abused. As a means of entertain-

ment, many ingenious experiments are made that come immediately under the class of Lectures upon Natural and Experimental Philosophy, from which much improvement is derived.

Lady L. I now clearly understand the properties of Electricity, and am greatly obliged to you for the information.

Ment. The next subject I shall discuss is Magnetism, a wonderful phenomenon that is produced by the power of the Magnet or Loadstone, which is a mineral that has the property of attracting and repelling iron.

Lady M. I have heard the Loadstone frequently mentioned; therefore, my dear Mentor, let me intreat you to be very explicit respecting its qualities.

Ment. The Loadstone, or Magnet, is a kind of ferruginous stone, in weight and colour resembling iron ore, though rather of a harder substance and heavier quality, endued with the powers of attraction. It is supposed to have derived its name from Magnesia, a part of the ancient Lydia, where it is said to have been first found; though many imagine it was so called from a shepherd named Magnes, who first discovered its attractive qualities, by the iron in his

his crook, on Mount Ida. This wonderful production is usually found in iron mines, frequently in large pieces, half iron and half Magnet. The best Loadstones are brought from China and Bengal, which resemble iron in hue; it is also found of various dimensions, and in a great number of different places; those of England, Germany, and Hungary have a strong similitude to unwrought iron.

Lady M. I have seen a Magnet attract a needle, and observed when the Magnet was held up, the needle appeared to be fastened to it, till it was removed by force.

Ment. This extraordinary circumstance was most probably produced by what is called an Artificial Magnet, which is a piece of polished steel impregnated with a magnetic quality. The effect you describe may be produced at any time, if you place a bit of iron near to one end of a Magnet, which will clearly prove its power of attraction. Every Magnet has what are called its North and South Poles, one of which has a repellant force to drive backwards the same piece of iron which the other will attract.

Lady M. By what means was the use of the Loadstone discovered?

Ment. Its attractive powers were known in the early ages of the world. Thales, the Milesian Philosopher, who flourished about 600 years before the Christian æra, surprized at its constant effect, ascribed to it the property of a soul. Aristotle and Pliny have mentioned its magnetic quality : but it was not till the twelfth century that it was discovered invariably to point to the North. The knowledge of these extraordinary properties prepared the way for the grand discovery of turning them to advantage in nautical matters. The only use the ancients made of this mineral substance was, as a remedy for burns and defluxions of the eyes : happily for succeeding generations its more important utility has been ascertained, as in the fourteenth century the mariner's compass was brought into use, and after various improvements has attained its present perfection. To the discovery of the attractive power of the Loadstone, we are indebted for the invention of this useful instrument ; as by observing the invariable tendency of a magnetic needle to point to the North, it has proved of the greatest service in determining the course of ships and the variation of the winds.

Lady

Lady M. Pray my dear Mentoria explain the construction of this valuable machine.

Ment. The mariner's compass is of a circular form, and has a kind of dial-plate divided into thirty-two equal parts, by right lines drawn from the centre to the circumference, which are called the points of the compass; the four principal ones, viz. East, West, North, and South, are termed the **Cardinal Points**. Over this dial-plate is suspended a thin piece of iron, which being touched by a magnetic virtue, by that means its two Poles are made to point nearly to the North and South Poles of the World; this is called the **Magnetic Needle**, and serves the important purpose of directing sailors what course they are to pursue.

Lady L. I cannot yet clearly understand by what means the Loadstone is so useful to navigators.

Ment. The compass may be invariably relied on as their guide, for however the ship may change its situation, the Magnetic Needle before described constantly points to the North, and by observations on the other parts, they are enabled to pursue the course that leads to the object of their destination, and to avoid what would steer them from it.

Lady

Lady M. Who first invented the Mariner's Compass?

Ment. This valuable discovery is usually ascribed to Flavio da Melfi Gioai, a Neapolitan, about the year 1302, in consequence of which, Principato, his native place, bears a Compass for its Arms. Others are of opinion that Marcus Paulus, a Venetian, A. D. 1260, made a journey to China, and brought back this useful invention: those who support this belief, alledge that when first the compass was used, it was on the same construction that is at present adopted by the Chinese, by having the Magnetic Needle floating on a piece of cork, instead of being suspended on a pivot; it is also supposed that the Chinese had some knowledge of the Loadstone's properties 1120 years before the Christian æra, as Chiningus their emperor was a great astronomer, and they assert made this, amongst many valuable discoveries. The French also put in a claim for the honour of this invention, from the circumstance of the Fleur de Lys being generally used as a sign to denote the North on any map or globe. The English form the plea for their share in this distinguishing honour, by the word compass being adopted for the appellation of this useful instrument,

as that word is used by them to express circuit or extent ; and though they cannot aspire to the fame of the invention, they are most likely entitled to the credit of having brought it to perfection, by suspending the box that holds the Magnetic Needle. I have enumerated the most probable sources of the valuable discovery of the Mariner's Compass ; though it is asserted by the French, that they had a prior knowledge of the Magnetic properties, as being of great utility in navigation, from the circumstance of some verses being extant, written in praise of the Marinette, or Mariner's Stone, in the year 1200. At such remote periods it is not possible to ascertain decisively on any controverted point ; it is therefore best to embrace those opinions which are the most generally received.

Lady L. By what means did sailors conduct their ships, before there were any Compasses ?

Ment. Previous to the discovery of the Polar Star and the attractive powers of the Loadstone, navigation was limited within very narrow bounds. The greatest enterprizes that were undertaken, and the principal traffic that was carried on by the ancients, were effected by coasting ; the mariners being afraid to quit the shores and launch into the main ocean, as they
were

were possessed of no specific rules to ascertain their respective distances and courses. The Phoenicians were the first who obtained the knowledge of the Polar Star; and they communicated this valuable discovery to the Ionians and other Grecian states, about 600 years before the Christian epocha. This circumstance will convince you that we are indebted to the Phoenicians for the first rudiments or elements of navigation. Tyre and Sidon, the chief cities in the Phoenician districts, were the centre or emporium of trade in those remote times; therefore the hope of extending their commerce made them zealous to adopt every means that could increase its channels, as their wealth and consequence were derived from no other source, their country being inconsiderable in extent, and from their intense application to traffic, its cultivation in a great measure neglected. In a progressive survey of nautical improvements, it appears evident, that from the indefatigable pursuits of the Tyrians and Sidonians, and their constant regard to the direction of the Polar Star, we derived the knowledge of the coasts of the Ocean, and those of the Mediterranean Sea, on the most Eastern part of which Phoenicia was situated. These commercial people extended their
traffic

traffic to Africa and many distant regions in Asia, and settled several colonies in various parts, which served the purpose of establishing a general mart for all valuable commodities.

Lady M. In this instance the Phœnicians appear to have had great merit ; but who were the first who had courage to explore the Ocean, and undertake the valuable discoveries we read of?

Ment. These important effects have been produced by the knowledge we have attained of the Loadstone's wonderful powers. When their properties were fully known, many states availed themselves of the benefits derived from them, and in consequence several important discoveries have been made ; but the most eminent and earliest example we can find, is the great and successful enterprize of Columbus, A. D. 1492, who traversed an expanse of Ocean, unknown but to his great ideas, and by compassing his intrepid undertaking, ascertained an immense extent of continental country, and a great number of islands, which comprize the regions of America, and what are usually called the West Indies, from which many valuable productions and great wealth are obtained. The ancients had a knowledge but of a small

a small part of the Globe, all America and the internal regions of Africa were wholly unknown to them: they were ignorant of the flux and reflux of the Sea, and were not convinced the Ocean surrounded the Globe entirely, though it was in some degree suspected; but none ventured to attempt a voyage round the World, till A. D. 1519, when Magellan, a Spaniard, undertook this great enterprize, and discovered the straits in South America, which bear his name. Sir Francis Drake was the first English circumnavigator, who returned from his successful voyage round the Globe in the year 1580.

Lady L. I remember in your Sacred History you mentioned the great services Hiram, king of Tyre, rendered to Solomon, when he erected the Temple.

Ment. He furnished him with timber, consisting of fir and cedar trees, from Mount Lebanon, which he conveyed on floats to Joppa, where they were delivered to Solomon's servants, and from thence brought to Jerusalem; and also provided him with artificers of various kinds, skilled in working gold, silver, and inferior metals, and dying scarlet, crimson, purple, and other colours, for which the Tyrians
were

were famed. For these essential services Hiram required to be supplied annually with twenty thousand measures of wheat, and twenty thousand barrels of oil for his household, exclusive of the same quantity of barley, wheat, wine and oil which Solomon was to bestow on the workmen employed in his service. These were the most acceptable compensations Hiram could receive for the benefits he conferred on Solomon, as Phoenicia was but a small tract of country on the sea coast, and agriculture but little attended to, as the inhabitants were absorbed in the acquirement of riches.

Lady M. I nevertheless think it was beneath the dignity of a king, to make a bargain for the supply of his table.

Ment. Solomon, exclusive of that condition, gave Hiram, as a token of gratitude, when the Temple and Queen's Palace were finished, twenty cities in Galilee, which from the nature of the soil displeased Hiram; he therefore refused the proffered gift, and in contempt called the whole land Cabul, which signified dirty or displeasing, thereby intimating no one could walk on it without being up to the ankles in dirt. Solomon afterward rebuilt and improved these

these cities, and planted colonies of Israelites in them.

Lady L. I hope that you have not finished your account of Tyre ; is it now a place of importance ?

Ment. In consequence of the power and eminence it obtained by the great influx of riches, the natural effects of its extensive commerce, the inhabitants were guilty of every species of enormity, which attracted the Divine displeasure, and caused a prophetic presage of their destruction to be announced, and its fulfilment was completed by Nebuchadnezzar, King of Babylon. The great wealth of the Tyrians rendered the conquest of their country a matter of great importance to the Babylonians, who after a siege of thirteen years subdued it, destroyed the city, and put the few remaining inhabitants to the sword, the greater part having fled with their possessions to a new city they had built about half a mile distant from the shore : this event happened 572 years before the Christian æra.

Lady M. I suppose Solomon would not have been able to have erected the Temple, if Hiram had not assisted him in the undertaking.

Ment.

Ment. No great design can ever be executed without the concurrence of auxiliary co-operation; gold in the mass, or precious stones in their native state, would not have embellished the sacred edifice; skill was required to form one, and polish the other; and these combined qualities could only be obtained by the joint efforts of persons possessing these separate gifts. The erection and decoration of the Temple were not the only advantages Solomon derived from his connection with the Tyrians. As the means of defraying the immense expences he had incurred in the execution of his diffusive plans and improvements, he built a great number of ships at Ezionzeber on the coast of the Red Sea, and when they were finished put them under the conduct of some expert Tyrian mariners, who with his men steered them to Ophir, or the Land of Gold, near a thousand years before the Christian æra.

Lady L. Where is Ophir, or the Land of Gold? I imagine many persons resort to it.

Ment. Respecting where it was situated, the learned differ in opinion; the most probable conjecture appears to be, that it was in some part of the East Indies, as those regions abound with the purest gold, silver, precious stones, ivory, ebony,

ebony, and other curious wood, spices, peacocks, monkies, and a variety of other valuable commodities, which greatly encreased the revenue of Solomon's kingdom : thus the Tyrians proved the means of this monarch establishing a navy, as their skill in navigation qualified them for executing the vast projects Solomon's power and riches enabled him to undertake.

Lady L. I think three years appear a great length of time for the ships to be going from the Red Sea to India, and back again.

Ment. In those early ages voyages were undertaken with extreme caution, and executed with great timidity ; at this period the Phoenicians had no knowledge of the Polar Star, or of the Mariner's Compass, they were consequently obliged to steer in such a safe course, as would prevent their being exposed to the dangers of the wide Ocean, as they possessed no certain means to determine the distance they were from the regions that were the ultimate objects of their destination. This circumstance points out the signal benefits we derive in these more enlightened times, from the perfection attained in the Arts and Sciences, a consideration which should inspire us with gratitude to the

the great source, from whence these and all other mercies are obtained.

Lady M. I am sorry you have closed your account of the Loadstone, as it has proved very instructive and entertaining to me.

Ment. And on reflection may impart an useful lesson, as I will suggest it is in your power to have its distinguishing properties reflected and exemplified in your own conduct and character, and also in Lady Louisa's.

Lady M. How can that be possible? What resemblance can there be between us who are comparatively so insignificant, and a substance which possesses qualities of such inestimable worth?

Ment. Intrinsic merit can only be appreciated in the certain sphere in which it acts; therefore if you perform the several duties allotted you, there cannot remain a doubt but that you will, like the Loadstone, attract the esteem of all worthy persons, as that mineral operates on iron; and I trust your just principles and discretion will in like manner possess the inclination and repellant power to reject all unworthy pursuits; as the Magnet repulses Iron that is in immediate contact with it, in
direct

direct opposition to its attractive properties : thus you will find Virtue is a Mental Magnet, which points as invariably to temporal felicity and eternal reward, as the Loadstone does to the regions of the North Pole ; and to pursue the simile, as the latter conducts mariners to their destined port, the former will steer you to the haven of celestial bliss !

DIALOGUE

DIALOGUE IX.

W E D N E S D A Y.

On Meteors of the Watery kind.

Mentoria.

THAT branch of Natural Philosophy which comprehends the various kinds of Meteors, is divided into the following classes, those of Fiery, Airy, and Watery properties.

Lady L. Of what do these respectively consist?

Ment. Fiery Meteors are formed of vapours ignited, or set on fire, such as Lightning, falling Stars, and other luminous phænomena that

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appear

appear in the air. Airy Meteors, as Wind, Tornadoes, Hurricanes, &c. are the effect of the unequal temperature of the air, arising from the action of heat or cold. Watery Meteors are composed of vapours or particles of water variously modified by heat or cold, namely, Rain, Hail, Snow and Dew. As the means of rendering this subject intelligible to your perceptions, I must explain the different properties of evaporation and exhalation, which in their regular process occasion the production of Meteors.

Lady M. I will be very attentive to these remarks, as those expressions I am wholly unacquainted with.

Ment. They are distinct terms and of a very different tendency. Evaporation implies the action of dispersing, or dissipating the moisture or humidity of a body, and Exhalation signifies a dispersion of particles of a dry quality from any mass or substance.

Lady L. Though we so frequently see it rain and experience its benign effects, I am totally ignorant of its natural cause.

Ment. The clouds from whence rain proceeds are produced by the heat of the Sun, whose attractive power draws the damp from the

the Earth, and the water from the rivers and seas : when these vapours unite in the air they form what are termed clouds, which are a compound of water and air ; these sometimes disperse again, but when the aqueous particles become superior to those of the air, they break through it and fall in rain, which forms distinct drops by the resistance it meets with from the ætherial body in falling to the Earth.

Lady M. When it rains the drops of water appear round, what causes that effect ?

Ment. Their globular appearance is produced by the power of attraction : for as every particle of water of which the drop is formed tends to a centre, every part must be equidistant from that point, which consequently makes it of a spherical form : from the observations I have already made you will perceive that the ascent of vapours consists in a repulsive force between the parts of matter, by which such as were separated from the surface of humid and other bodies, were repelled and driven up into the air in the form of exhalations ; I have previously remarked that the density or weight of the air is greatest near the surface of the Earth, and that its dense quality gradually decreases as it ascends ; whence it happens differ-

ent effects are produced according to the height of their respective regions, which is occasioned by the various proportions of the gravity or weight of the air.

Lady L. How different the clouds appear, sometimes they are beautiful beyond expression, at others, lowering and tremendous in their aspect.

Ment. This effect is produced by the various proportions of the weight of the air which occasion the clouds to ascend in progressive order, and by reflecting the light of the Sun above and below the horizon, present to our view such a variety of beautiful tints and shades as delight the eye and excite our astonishment: as I have enumerated the general cause of rain as produced by the concurrent effects of Air and Water, I shall now proceed to point out the influence of the Winds in the production of Rain.

Lady L. I have frequently heard persons remark that it was likely we should have rain, as the Wind was Southerly or Westerly.

Ment. They had rational and philosophical grounds for their expectation, because those Winds that blow from the Ocean, as the South or West Winds bring large recruits of vapours to the clouds, and therefore are more likely to produce

duce rain than other winds which proceed from the land or continental regions, like the North or North East Winds which generally operate to disperse the vapours or dissipate the clouds. Having thus explained the nature and properties of Rain as to their physical causes, it only remains for me to delineate the proportions in which they are dispensed, which are the effect of divine goodness ; as, instead of being salubrious, or beneficial, Rain would be productive of floods, and absorb the general mass of animal and vegetable nature in destruction if it came in torrents without due intermission. By the disposing Omniscient Power of the great Creator of the Universe the general means of receiving the blessing of rain consists in gentle showers, or rains, that from their quantity and quality are exactly suited to the important purposes of producing vegetation, and fulfilling other essential requisites to animal existence.

Lady L. I reflect with much concern that I have never formed a proper estimate of this blessing, as I have often murmured when it rained, if by that means I was deprived of walking or going out in an open carriage.

Ment. This regret was occasioned by the strong impulse of your natural feelings impatient under the delay of an expected enjoyment

and from want of due reflection, ignorant that your disappointment was perhaps an universal blessing; as rain is the harbinger of plenty, whilst continued drought must inevitably produce pestilence and famine.

Lady M. Pray my dear Mentoria what is Hail, it sometimes falls in tremendous showers?

Ment. Hail is only the drops of rain congealed into ice, which is occasioned when in their passage through the inferior regions of the air they meet with nitrous particles that in a great measure contribute to freeze or congeal them. In ascertaining the properties of Hail, it is evident it seldom hails but when the air is heavy and the vapours ascend to a great height, which is usually the case in Summer time, when hail-storms are more frequent than in Winter. In the higher regions of the air the cold is more intense, and therefore it is imagined abounds with a superior quantity of Nitre, which causes a more immediate and stronger congealment of the aqueous particles, and forms them into a body of ice of various sizes, their magnitude differing according to the degrees of cold which produced them. These icy substances acquiring considerable weight, descend

descend from those heights to the Earth in the form of a shower of hail.

Lady L. Hail-stones are often of a great size and do much mischief.

Ment. Their size or magnitude is in some degree occasioned by their acquiring a fresh accession of matter in their descent and progress to the Earth. Hail-stones are various in dimensions; it is asserted there have been some in foreign regions as large as a turnip or Seville orange; in our country they have been frequently found one fourth of an inch in diameter: these formidable showers are productive of the most destructive consequences, particularly to vegetation of a delicate texture or infant growth; the form of Hail-stones is not always the same, they are generally conical or oblong.

Lady M. You frequently mention Nitre as a part of the composition of Meteors; I imagined it was a medicine: explain this circumstance to me?

Ment. The Earth is formed of different strata or layers of matter which by the Sun's attractive power is diffused through the body of the atmosphere for the general benefit of the Universe. Thus the Air is impregnated with different qualities, Nitrous, Sulphureous, &c.

which co-operate to produce vegetation, and by their salubrious effects, to prove universally beneficial. Nitre, which is the subject of your inquiry, is a salt extracted out of the Earth, abundantly incorporated with the spirit of the air; it is of great and general use in medicine, as its cooling saline properties are very effectual in the reduction of fevers, and a variety of other cases produced by an exuberance of heat.

Lady L. I am impatient to hear what Snow is composed of; it is a beautiful substance which I greatly admire.

Ment. Snow is produced by the vapours becoming considerably condensed, yet not in so great a degree as to be changed into Water; in this state, by a great degree of coldness in the upper regions of the air, the particles of the condensed vapour are congelated into ice; several of them, by adhering together, compose small fleeces of a white substance, something heavier than the air, which consequently descend in a slow and gentle manner through its medium, being subject by their peculiar light quality to be driven about by the various motions of the wind, which produce what we call drifts of Snow.

Lady

Lady L. When I see the Snow fall, I shall observe it with more pleasure than I did before I knew from what cause it was produced.

Ment. Snow, when philosophically defined, is demonstrated to be the natural effect that saline particles of every quality possess, to collect together and constitute some specific form: this is what is called crystallization; therefore flakes of Snow are only these accumulated bodies, which descend to the Earth when their weight is too great to be sustained by the Air; so that Snow, when analyzed, is evidently nothing more than saline, aqueous particles, congealed by the degrees of cold in the higher regions of the Atmosphere.

Lady M. I am much obliged by your giving me so copious an account of Snow, and entreat the favour you will explain the qualities of Frost.

Ment. The converting a fluid body into a hard solid mass, by the influence and action of cold, is denominated Freezing or Congelation, which terms are appropriate to liquids when transformed into Ice. Various are the opinions respecting the natural causes which produce that effect; it appears highly probable it is occasioned from an abundance of saline, nitrous

particles then abounding in the air, which penetrate into the porous parts of the water, and by that means render them dense in quality. The effect of Congelation is uniformly attended with the emission of heat; Water also diminishes in weight by the process of its frozen state, and evaporates almost as much as when it was in its native fluid form, and in proportion to the degree of cold this evaporation increases. It is also observed that Water that has been boiled is more speedily Congelated than before it has undergone that operation.

Lady L. Frosty weather is very agreeable, when it is not too severe.

Ment. This, like every other Elementary dispensation, abounds with advantages, which on a cursory view, we are not always able to estimate to its due extent. In the oeconomy of Nature, the primary object appears to be universal benefit, which is pursued by wise measures, ordained and administered by the great Author of Existence. The effects of Frost, like every other means employed for the advantage of the whole system, though partially or individually they may prove unpleasant or destructive, yet in a compound sense eventually operate beneficially. Thus you who bask in the sun-shine
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of Prosperity walk out on a Frosty day, and enjoy the clearness of the Atmosphere, warmly clad, and fenced against the cold, and on your return, with an appetite encreased by the keenness of the air, sit down to a plentiful and elegant repast, cheared by a blazing fire and enlivening intercourse : reflect, that whilst you enjoy all these blessings, many pine in want for the common comforts and conveniences of life. Numbers who acquire a competent subsistence in the lower ranks of life, by cultivating the Earth, working on the Water, or in other employments influenced by the weather, are by the means of Frost deprived of support, from not being enabled to pursue their respective vocations. 8 How many by this circumstance can obtain neither Food, Raiment, Fire, nor Shelter ? to them the storehouses of plenty seem shut, and if it were not, that the hearts of those who possess abundance, did not melt in proportion as the Earth and Waters freeze, a great and valuable part of the community would perish and be plunged into an abyss of misery. The human race are not the only beings who sustain a trying conflict during this severe yet salutary season ; Beasts of the Field, Birds of the Air, Fishes, except those in Seas or great

Rivers, Reptiles and Insects feel the force of this congelated temperature, as their natural resources of food in a great measure fail by the influence of a long continued Frost: thus there appears an irresistible claim for liberality, when the very Elements conspire to lock up their treasures in impenetrable security. Charity is the mental solar ray which thaws the icy chains of Poverty; Benevolence is the balm which heals the galled wound of an afflicted heart, zealous to acquire the necessaries for support, yet by the rigour of the season deprived of the due means. During this inclement period, various are the appeals for aid, the calls of necessity render the timid bold, and self-preservation (which is one of the first laws in nature) operates to induce the subordinate parts of the creation to urge by their near approach and plaintive tones, the benevolent assistance their destitute state requires; under this influence the Robin-Red-Breast almost becomes an inmate in human habitations, and many other instances might be produced of a similar nature, to enforce the practice of that philanthropy which it is my endeavour to inculcate.

Lady

Lady L. There is so much pleasure in relieving the distressed, I will never neglect any opportunity afforded me.

Ment. I wish your charity to be diffusive, but not indiscriminate; as judicious benefactors should bestow those gifts which are likely to prove most useful to the objects of their bounty. The circumstances I have been enumerating, whenever they occur, are but so many opportunities to place your virtues in the fairest light: be liberal in your donations, but not ostentatious; seek the afflicted in their most obscure and concealed recesses; obey the impulse of your feelings, which will lead you to perform kind services; but above all, blend sympathy with your alms; as many when they bestow gifts, by an ungracious look, or an unguarded harsh expression, eclipse the merit of the act, by the rigid, austere mode of its performance.

Lady M. I will ever avoid this unamiable conduct, and in every instance will strive to mitigate the sufferings of the afflicted.

Ment. Philosophy may make you Wise, but it is Christianity alone that can make you Good; and in its divine precepts the practice of Charity is enforced as an essential quality in
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the formation of a perfect character, by which quality we are to understand not only the giving of alms, but also that general benevolence of heart, that is productive of universal philanthropy or good will.

Lady L. I will endeavour to regulate my conduct by these and every other rule prescribed in the Scriptures.

Ment. An adherence to this resolution will render you respectable and happy, as uniform good conduct is sure of attaining eternal reward. I shall now endeavour to explain the properties of Dew, Hoar Frost, Mists, &c. which will close my remarks on the process of Freezing, or Congelation. When the air is full of vapours, if a breeze arises and checks their solution, they form clouds in the lower regions of the atmosphere which constitute a mist or fog: this effect is usually produced in a cold morning, and is dispersed when the Sun has rarefied the air sufficiently to dissolve the aqueous particles, of which mist of all qualities are composed. From these observations it will appear evident, that what we usually call a Fog, is a Watery Meteor, composed of gross vapours floating near the surface of the Earth, and is produced by the intense cold quality of the air, that prevents

prevents the vapours ascending through it, which by becoming condensed in the lower regions of the atmosphere, either fall in Dews, Hoar Frosts, or drizzling Rain, or continue suspended in the form of Fogs. The dimensions of any object viewed through the medium of a Fog appear magnified, and in fact Fogs are only clouds of vapour formed in the atmosphere near to the surface of the Earth, which render their effects very dangerous to travellers and persons engaged in many particular occupations.

Lady M. I was surprized one day last winter, that our coachman was so much alarmed, when he found the Fog encreased to a very great degree.

Ment. He knew from experience that caution, not skill, would be the only probable means of counteracting its dangerous consequence. The gross particles of which Fog is composed, obscured the perception of visible objects; therefore he was fully aware, unless he could obtain artificial light to pervade the misty vapour that surrounded him, he might the next instant be immersed in a river, or be hurled into an abyfs from which no human means could extricate him; as what we usually call accident, is frequently natural consequences, which might
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be timely avoided by vigilance and prudent circumspection.

Lady L. Are not Fogs very unwholesome?

Ment. The gross quality of vapour that forms their constituent parts, is in many instances too powerful and oppressive for delicate organs of respiration to contend with. I shall now proceed to inform you of the qualities of Dew, which is a dense vapour of a moist quality that falls on the Earth, like a kind of drizzling rain. The refreshing nature of this Aqueous Meteor is so well known, and its salubrious effects so generally experienced, I shall only observe, that the Earth in fair dry weather naturally becomes parched by the heat of the Sun, at which period the watery and other less volatile particles, as those of a saline or oily quality are by the attractive power of the Sun, raised into the air, and occupy those regions in the atmosphere that are nearest to the surface of the Earth. Whilst these exhalations are kept in agitation by the solar heat, they are not visible; but when that heat begins to abate, a white dense vapour collects, which continues till by the genial heat of the rising Sun in the morning it is entirely dissipated. The essential difference between Rain and Dew, consists in the follow-

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ing particulars: that the condensation of the former is produced at a considerable distance from the Earth, and the latter is occasioned by that effect very near to the object on which it falls, which happens from the various operations of cold upon the vapoury air; and what is called the Hoar or white Frost is nothing more than the Dew changed into ice by the influence of extreme cold: black Frost differs only from this in not being attended with a mist or Fog, and by not appearing white.

Lady L. I have frequently perceived the great advantages that plants of every description derive from the Dew falling on them; but I think I recollect taking cold from wetting my feet, by walking on grass which was very damp, in consequence of a great degree of Dew that had fallen after a very hot day.

Ment. This unlucky circumstance is no argument in disfavour of the salutary influence of Dew, the same heat that had parched and nearly withered the flowers and plants, had also opened the pores of your skin; the former were replenished and recruited by the natural supply of Dew, which is congenial to their generic qualities, and in fact operates on vegetation as food and medicine; whilst on the contrary,
your

your temperament received a check which it was happy proved productive of only a slight degree of indisposition, as those effects often prove fatal to the human constitution, which evinces the necessity of avoiding exposing ourselves injudiciously to the sudden transitions of the Elements. Thus much for the general properties of Frost and Dew, which naturally lead me to consider the quality of what is termed Cold, that produces them in their varied effects. On strict investigation, Cold appears to be only a comparative term, and implies nothing more than a less degree of Heat. By various experiments it is proved that many bodies will liquify with one degree of heat, and become fixed or frozen with another; which is the case with Metals, Salts, Oils, and Water; with one degree of warmth the latter will appear in a fluid state, and with a less degree the particles will be found to be fixed or congelated; in like manner the vapours in a warm air are in a fluid state, and when condensed by the cold of the evening and descend, they adhere to the grass, and assume the appearance of pearly drops, which in that state is called Dew; but these particles by the influence of a colder air become fixed, and whilst they are floating in the Atmosphere,

constitute a rainy fog or frozen mist which when they descend fall on the grass, shrubs, trees, &c. and produce a beautiful effect from the kind of crystalline incrustation this hoar or white frost exhibits.

Lady M. I cannot express how greatly Lady Louisa and myself are obliged by the variety of information with which you store our minds.

Ment. It is my hope and my endeavour to render you rich in Nature's best gifts, extensive knowledge and a just sense of the various obligations of duty; valuable possessions that I would not on your behalf exchange for all the gold and diamonds, that Golconda and Peru produce.

Lady L. I am sorry you appear to have finished your account of the watery Meteors.

Ment. Perhaps this definition may be incomplete, if I do not give you some idea of the properties of Water in its fluid state. This element possesses many extraordinary qualities which would carry me beyond my present purpose, circumstantially to enumerate; I shall therefore only dwell on those particulars that may tend to give you a general sense of its importance.

portance. As fluidity is the effect of the influence of heat, it is asserted on philosophic grounds that ice is the natural state of Water ; by the increase of heat Water is rendered elastic and volatile and becomes a vapour, which is again condensed into Water by the superfluous heat being withdrawn. I shall next observe the effect it produces from pressure or force, which varies in proportion as its depth does, without any respect to its breadth ; if it were not for this property vessels would be forced against the shore in their sailing process, and navigation consequently impeded in its course. It is also observable that Water always rises to the level of its source, even when conveyed in pipes or other channels : this wonderful effect is occasioned by the pressure of the atmosphere, which by its general influence on all parts of the fluid body impels it from its source to pass through any medium or vehicle till it meets with an equal resistance from the pressure of the atmosphere at the other end or termination : when this pressure of the atmosphere is removed, Water will rise to the height of thirty six feet, which is occasioned by the weight of the body of Air on the Water's source. It is on these principles that Water-works, fountains, and

and even common pumps are constructed. Water contains a certain quantity of air, and from its various changes produces many beneficial effects; in their various vicissitudes we may trace that vapours are raised by the Sun from the expanse of the Ocean by the general operations of evaporation, the effects of which are diffused by the Winds through every region and climate; when their course is interrupted by the summit of Mountains their accumulated matter forms itself into clouds and descends to the surface of the Earth in the quality of Rain, Snow, Dew, &c. The exuberant parts of these exhalations by their tendency to gravitate, bend their course through Brooks and Rivulets till they meet with Rivers, and from thence revert to the Sea, and again are subject to a rotation of the salutary consequences I have previously described.

Lady M. How surprising these circumstances are: I am very happy I am sensible by your kind instructions of their wonderful variations,

Ment. The quantity of subterraneous Waters is incalculable; it is generally imagined that in the space of the Earth's surface more than two thirds of the Globe consist of Seas. The diversity of Mountains, Hills and Vallies

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are an eminent example of the wisdom of God manifested in the creation ; as, if the Earth were perfectly level the Waters would be unavoidably stagnated, and in consequence produce several fatal effects. When we seriously reflect on the beneficial properties of Water in the general system, it excites our gratitude and praise ; but when we extend our enquiry to the individual advantages it produces to the human race and every species of animals as well as every branch of vegetation, we are lost in wonder in the contemplation of these transcendant instances of Divine Mercy. This active fluid conduces very universally to the comfort and existence of animals of every genus ; it is the medium to produce the fruits of the Earth, to dilute food, to allay thirst, and also is the genuine element of a variety of animated beings who could not live in any other sphere : from these considerations it appears evident that Water is an essential blessing without which we could not subsist, as the possession of solids would not operate to the preservation of life unassisted by the happy effects derived from fluidity in the concoction of our food, and many other important purposes. Another advantage may
be

be suggested, experienced by the human race, from the various Springs of Water that arise in the Earth, endued with medicinal virtues, occasioned by the different stratum of the Earth through which they pass, some being hot or sulphureous, others chalybeate or of an iron or steel quality, and several impregnated with a variety of nitrous and other properties, derived from the mineral particles, of which the mass of Earth is composed.

Lady M. I have been at Bath and Tunbridge, and have tasted the Waters which render those places so much resorted to.

Ment. Health is the greatest blessing that, as human beings, we can enjoy ; its uncertainty and privation convinces us of its value ; yet like many other important possessions, it is frequently lavished by the intemperate fallies of youth, or the depraved effects of passions at a more mature period of life. In pursuit of this treasure, many who are afflicted with diseases go to places distinguished by medicinal springs to seek relief, which they often find ; and I hope are duly sensible of the Source or Fountain which flows with the Streams that recruit impaired strength, and tend to the prolongation of life.

Lady

Lady L. I had no idea of the variety of good effects we experience from Water, which I am afraid many inconsiderate persons do not estimate as they ought: I am conscious I never ascribed to it half the consequence I now perceive it possesses. Pray, Mentoria, do not quite close your remarks on it.

Ment. As far as relates to its genuine properties, I believe I have exhausted all the observations necessary for your immediate consideration, therefore shall close my account of Watery Meteors; but as I ever wish to comply with your requests, I will extend my lecture, by endeavouring in a kind of metaphor to shew you the contrary effects of Frost and Dew, exemplified in the characters of Avaro and Benevolus, that the contrast may produce in your mind some forcible impression respecting the opposite qualities of Avarice and Philanthropy, which bear a strong similitude to the rigidity of Frost and the benign effects of Dew.

Lady M. Forgive me, my dear Mentoria, if I betray a degree of impatient anxiety for you to begin these interesting traits of human life, which I have no doubt will have a strong moral tendency.

Ment.

Ment. Avaro was of a low origin, yet by the concurrence of some favourable circumstances, at an early period of life was established in a lucrative employ. His understanding was moderate, and received no degree of cultivation beyond the common rudiments of education, essentially necessary to fulfil the laborious mechanical duties of a commercial vocation. By the joint efforts of perseverance and uniform punctuality in the general routine of business, Avaro succeeded in all the enterprizes he undertook; an increase of wealth was the consequence of his prosperity, and in the course of a very few years he became possessed of considerable property, the natural result of unremitting assiduity. His conduct in his youth had been marked with approbation, as his success was in some degree imputed to his merit, and in his private domestic concerns he adopted a rigid economical plan, which at first attached to him the character of a Prudent Man. As Avaro's sphere of action was circumscribed to the small space of the Royal Exchange, Custom-House, and Bank, his ideas were inadequate to a more excursive range, consequently his imagination respecting happiness never soared beyond a confined situation in one of the most undesirable

parts of the city, which afforded him neither light nor air, in a degree much superior to what might be obtained in a dungeon. Avaro's increase of wealth served no other purpose than to contract his heart, and the rapid accumulations he experienced only tended to make him the more insatiable in pursuit of Riches, and their consequent concomitants, oppression and power. The sordid quality of Avaro's disposition precluded a taste for the convivial pleasures of society, therefore his habits of life were parsimonious and misanthropic. His notions of enjoyment alone consisted in an extension of those possessions, which when sought with unrestrained ardour, are too often gained by means disgraceful to human nature. His rapacity kept pace with the increase of his treasures, and steeled his heart with that kind of Apathy, which might be said to resemble Frost, as it congealed the Fountains of Compassion, and stopped the Current Tide of every benevolent sensation. He was Deaf to the eloquent entreaties of hapless innocence in distress, Blind to the ostensible wants of the hungry and naked, Oppressive to his tenants, Reproachful to the very poor to whom he refused relief; and above all, was Niggardly to himself, as he experienced Want in the midst of Plenty,

Plenty, lived as an Alien from friendly intercourse, and died unlamented by even his nearest relations!

Lady L. I cannot see for what purpose Avaro was so penurious; pray what became of his vast possessions?

Ment. In defining the character of a Miser, we must consider him as an Agent, employed in amassing riches that will in the end be converted to their proper use. Avarice is one of those perversions of human blessings, that one cannot contemplate without abhorrence, and unquestionably is a disease of the Mind; as an inordinate thirst for Wealth is like the eager desire which delirious persons feel in a raging fever for the attainment of liquids, in a proportion superior to what they can swallow or enjoy. The incitements to this vice are gradual in their progress, and in the first instance originate in the fallacious idea of self-gratification; as the Miser aims at Riches, which according to his principles are the source and end of happiness, unheeding that his Golden Harvest will probably be reaped by an unthankful legal descendant, who will dissipate his Wealth with the same degree of profusion, as he has used of artificial penury, to effect its amassment. This

general consequence Pope thus emphatically expresses.

Who sees pale Mammon pine amidst his store,
Sees but a backward Steward for the Poor ;
This year a Reservoir, to keep and spare ;
The next ■ Fountain, spouting through his
Heir !

Observations on human life and manners bear evident proof that Gold, when once it has obtained the medium of circulation, like Water, will always rise to the level of its source ; as notwithstanding it may for a season be consigned to the dreary abyss of the Miser's iron chest, by the decrees of an over-ruling Providence contingencies happen that operate as the weight of the atmosphere invariably does on Water, to bring it to its native channel, for the universal benefit of the community.

Lady M. I can clearly perceive a very great similitude between Avaro's character and the qualities of Frost, as both are rendered impenetrable to tender impressions. How essentially Splendidus's conduct differs from the example of the fordid conduct you have just described !

Ment.

Ment. Splendidus does not appear to me to form the strong contrast I wish to exhibit to Avaro's unamiable character; profusion of expence, and apparent magnificence in the general course of life, frequently rather impede than produce generosity and benevolence of mind; as an ostentatious display of riches is often accompanied by selfish principles, meanness of spirit, and corruption of heart; therefore I shall chuse the intermediate qualities which Benevolus possessed, to exemplify the happy effects his uniform conduct produced, which operated like the benignant Dew.

Lady L. My dear Mentoria, how can we express our obligations to you for thus portraying the characters of Virtue and Vice in such strong colours, that they produce in our minds the just sensations of abhorrence and esteem!

Ment. Benevolus was descended from an ancient family, and resided on his paternal estate, which was situated in a Western county, at a considerable distance from the metropolis. In his youth he acquired a competent share of every useful and polite accomplishment, usually attained in the regular course of a liberal education; as his fortune was very large, he did not pursue any profession from lucrative motives,

tives, but as his general plan was as a citizen of the World, to be diffusively useful within his sphere of action, he studied Law to enable him to assert his own rights, and to protect those of others; and also bestowed great attention on the Medical Art, that he might administer relief to his indigent tenants and other distressed objects in the vicinage of his domain. With these laudable inclinations and ample qualifications for their discharge, Benevolus dwelt in the mansion inhabited by his ancestors for many centuries, which he judiciously improved, but preserved every vestige that remained of its venerable antiquity: and as his turn of mind was perfectly domestic, he married a very amiable woman, who coincided in all the good offices Benevolus planned or executed, and in her peculiar department suggested many improvements and salutary measures for the completion of their philanthropic system. As wealth is an essential quality in the performance of munificent acts of charity, Benevolus apportioned a certain part of his income to that laudable purpose, and formed a regular arrangement for his own expenditure, with which he maintained a degree of splendor adequate to support the dignity of
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of his family, yet under such restrictions as to avoid profusion and prodigality. Under the influence of this prudent conduct, Benevolus became the arbiter in all disputes in the circle of his neighbourhood ; the friend and the physician to administer relief to the diseased in body, or afflicted in mind ; and the patron to advance the interest of all who implored or required assistance. The disconsolate Widow and helpless Orphan found the defect of a Husband and Father supplied by Benevolus's judicious bounty ; the Aged experienced in his kindness a staff to lean on for support ; the Infants lisped his praise, and persons of all descriptions and ages resounded his eulogium. To these perfections he also added a distinguished degree of zeal for the advancement and welfare of all public institutions and improvements, to which he largely contributed his pecuniary aid. In the execution of his designs for the general benefit of society, he found employment for the idle ; by his admonitions and example, reclaimed the profligate, and often by his zealous efforts effectually restored those who had flagrantly wandered from the path of duty. This philanthropic turn of mind and genuine purity of heart, was produced by

strict adherence to the principles of Christianity, strengthened by reliance on the decrees of the Supreme Being, which operated to constitute a character that rendered Benevolus an object of universal esteem during his terrestrial probation, and caused his death to be a subject of general regret : as his virtues were of that superior quality, to entitle him to the loudest plaudits of Fame!

Lady L. Benevolus may with great justice be compared to Dew, as he appears to have possessed all those qualities which are the characteristic excellencies of that salutary Meteor.

Ment. The Christian charity which comprehends a general system of moral perfection, and was eminently conspicuous through the varied scenes of Benevolus's warfare upon Earth, bears a literal similitude to the fructifying effect of Dew, which is dispensed to recruit vegetation in its languid drooping state ; as philanthropy enlivens the plants of adversity, and causes them to shoot with blossoms of hope ! I cannot close this account of Watery Meteors without subjoining some observations on the advantages which are obtained by the absorption
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of solar heat produced by the general process of evaporation, which conduces to the gradual change of the temperature that in every progressive season we experience, and largely contributes to prepare the Earth for culture, and produce the benefits derived from fertilization, and the universal harmony of terrestrial blessings.

DIALOGUE X.

THURSDAY.

On Meteors of the Fiery kind.

Mentoria.

I AM now going to enter on the subject of the most awful and sublime effects of Divine skill, exemplified in Thunder and Lightning. It was generally believed that this tremendous Meteor was the natural effect of Sulphureous, Nitrous, Spirituous, Bituminous, and Acetus or acid particles, exhaled from various bodies which ascended into the air, and after various fluctuations by the motions of the wind, were in consequence so much agitated, that by striking against

gainst each other they forced themselves through the clouds, and by their joint action produced the explosion which is termed Thunder, and a flash denominated Lightning, the bituminous and sulphureous occasioning the stream of light, and the nitrous and other qualities the tremendous sound, by repeated efforts or claps of Thunder. Modern philosophical observations have at length demonstrated that Lightning is an Electric fluid, and that some clouds possess a positive, and others a negative state of Electricity, and the greatest flashes are probably produced by the Electric fluid combining in some degree with the vapoury particles of the air. The claps of Thunder which are connected with the flashes of Lightning appear to be occasioned by the filling of the great space made by the progress of the electric matter; as its vibration, which is the source of its sound, commenced at the very instant: which is evident from the echo, or repercussions that are heard before the sound finally reaches the ear. From various experiments on the different properties of the Electric Fire, it is a probable conjecture that these variations are produced by the fermentation of different particles in the atmo-

phere, such as those of a sulphureous and acid quality.

Lady L. The sound of Thunder is so terrific, I tremble when I hear it; and am greatly alarmed when it lightens.

Ment. It may not be in our power to conquer apprehension, when the subject of our dread is fraught with evident signs of portending danger; yet the kind of resignation that is produced by trust in Divine Providence, keeps those sensations within proper bounds. In a tremendous storm of Thunder and Lightning, no rational being can deny that the most fatal consequences may accrue; but as these instances are comparatively rare, we should fortify our minds by a firm reliance on the protection of God, under whose omnipotent direction Bolts of Thunder and Flashes of Lightning pursue their destined course. When beset with instruments of danger, it would be presumptuous to think ourselves secure; yet on the other hand we should zealously guard against those emotions, which when properly defined, are in effect a kind of sinful distrust.

Lady L. I will endeavour to adopt the conduct which you inculcate with so much energy.

Ment.

Ment. It is not sufficient that you avoid being apprehensive, the circumstances of this awful predicament require also that you should express gratitude for the protection you experience during this general convulsion of the Elements; as objects of greater magnitude and importance are often destroyed, whilst you have escaped the dire effects exhibited in a tremendous storm, which is the entire effect of Divine mercy, not of your superior merit.

Lady M. Pray, my dear Mentoria, favour us with some further particulars of the properties of Thunder and Lightning. What is a Thunder Bolt?

Ment. It is a substance consisting of a compact undissolved body of ignited matter, which had not time to explode in the air, but is darted with the velocity of light itself, to the objects on the surface of the Earth, and acts with irresistible force; its fatal effects are manifested by the destruction of trees, buildings, and every other substance (even those of the strongest texture) that obstruct its progress.

Lady L. Lightning is not always destructive; and does it not frequently appear unattended by alarming symptoms?

Ment.

Ment. The Electric matter of which Lightning is composed, may be divided into three distinct classes: the first is that in which it simply explodes and flashes, in a degree of force insufficient to be destructive; the second is when it explodes with greater force, or density, which often operates to strike persons blind, or set various objects on fire; the third and last stage is that of the Thunder Bolt, which is the most awful state of this wonderful phænomenon. From the observations I have already made, you will perceive that Thunder is probably produced by a sudden kindling of combustible exhalations in the clouds, and Lightning is nothing more than the Fire bursting from those clouds: this opinion is confirmed in a great degree by storms of Thunder and Lightning, being most frequent in sultry weather, when the air is more strongly impregnated with sulphureous and other combustible particles. With all due respect to modern experiments and opinions, from just deference to Sir Isaac Newton's theory of optics, I shall inform you that he defined Lightning in the Heavens as analogous to the flashing of Gunpowder in an unconfined state or condition, and that Thunder produced a similar

milar effect to the report of a Gun, from the powder kindled but confined in the barrel.

Lady M. I recollect seeing Iron conductors put on houses and other buildings, as the means of preventing fatal accidents from Lightning; how can they operate so beneficially?

Ment. The Fire of Lightning is Electrical, therefore can be attracted by non-electric bodies, such as Iron, Earth, &c. so that these conductors are intended to prevent general bad effects, by the antidote of a partial attraction.

Lady L. Is not Lightning invariably seen before the Thunder is heard?

Ment. Undoubtedly, and always in a medium of proportion to the distance of the Thunder clouds; as Light travels with a greater degree of velocity than Sound.

Lady M. In what respect does Thunder prove beneficial?

Ment. By altering the state of the air, and by an explosive effort dispersing those particles which might prove of a hurtful tendency, if they remained floating in the atmosphere. Air, like Water in a stagnate state, would be productive of diseases and scarcity, originating from its putrid tendency; this dire effect is happily counteracted by Winds, Thunder, Light-

Lightning, and other Meteors which operate to purify the regions of the air, and conduce to the general harmony of the seasons.

Lady L. I will forbear in future repining when it Thunders, as I clearly perceive it is attended with general benefit to society.

Ment. In treating of Meteors I must not omit mentioning Falling Stars, which are also vapours kindled in the Air, often very near to the surface of the Earth, and sometimes in the higher regions of the atmosphere: many are of opinion these, like other fiery meteors, are pure Electric matter.

Lady M. In some of your former instructions I remember you mentioned a Meteor called Ignis Fatuus, commonly termed Will with a Wisp, or Jack with a Lantern.

Ment. It was a subject of general belief, that these luminous vapours frequently arose in marshes, and other damp situations, forming a Meteor resembling the flame of a candle, which frequently misled travellers; but at present there are doubts entertained whether these effects were not more the consequence of a deluded imagination, than a circumstance existing in nature. The real quality of this exhalation is defined to be an ignited vapour produced by the decomposition

tion of vegetable substances in low marshy situations, or bogs, that from the inflammable air with which they abound, cause a luminous appearance, and by wafting near the surface of the Earth, create alarm and apprehensive sensations in superstitious uninformed minds, and consequently attach the idea of this phænomenon being the effect of supernatural causes. These Meteors are sometimes seen in different numbers on the same spot, and by intersecting each others paths with great rapidity, they frequently disappear all at once, which is probably occasioned by their meeting with some object in their progress, which obstructs their course.

Lady L. Those must be very weak persons who are frightened when these Meteors appear.

Ment. Prejudices are conveyed by the ignorant, and implicitly received by those who are immediately connected with them, by the relative ties of kindred or friendly association ; this medium is the native source of the propagation of error which takes deep root in understandings that are not within the sphere of receiving genuine information.

Lady

Lady L. I have frèquently seen the Aurora Borealis, Streamers, or Northern Lights, are they Meteors?

Ment. Without doubt, and of the Fiery kind, as they have a luminous appearance, which is sometimes visible at night in the Northern part of the heavens, and is almost constantly perceptible in the regions near the North Pole ; its natural causes have not hitherto been decisively ascertained, though it is almost universally allowed that this Phænomenon is solely produced by Electric light.

Lady M. I fear that you have finished your account of Meteors, which I much regret.

Ment. As I have so fully described those of the Watery and Fiery kinds, there only remains the Airy class to be considered, the properties of which I explained in the regular course of my definition on Air ; therefore I shall only add a few general observations respecting the benefits that are derived from the variations of the Winds. In a commercial country like Great Britain, the fluctuations of the Air, which comprehend the various Meteors denominated Winds, are productive of many substantial advantages ; as they cannot blow from any point, without wasting to our shores.

shores the productions of the most distant climes.

Lady L. I am convinced of the advantages you have enumerated ; yet I should always like the Wind to be calm.

Ment. Before we seriously form such a wish, we should duly consider the probable consequences of a tranquil state of the air. If there were a general calm, the Winds would undergo but slight variations in the body of the atmosphere, which would produce the most fatal effects ; vessels would be slow in their progress, and the general purposes of trade and navigation considerably impeded. After having thus amply considered the different properties of Watery, Fiery, and Airy Meteors, and their natural causes, there appears no branch remaining that claims attention, except the general qualities of Fire which I will endeavour to explain.

Lady L. I wish to hear an account of this Element, as it produces many great and wonderful effects.

Ment. The real nature of Fire has been the subject of dispute with naturalists and philosophers ; some maintain the opinion it arises from a violent motion of the parts of any body

or

or substance, whilst others assert it is a fluid possessed of certain qualities distinct from every other : the latter seems to be the system best approved, and most generally received. By the term Fire, I wish you to understand that wonderful subtile agent of nature, which by some invisible cause, expands bodies, and renders them hot to the touch, by the effects of which fluids are rarefied and changed into vapour, and in the end evaporate, or terminate, by being melted into glass. From various experiments it is evident that Fire exists and acts unconnected with matter, independent of every terrestrial substance, neither being produced nor compounded with any thing of which we have any knowledge or perception. The action of Fire is proved by a number of ingenious experiments, as well as by the common consequences we perceive ; and from an investigation of solar light, a certain modification of that quality is most likely the primary cause of heat, expansion, vapour, &c. as it in every respect answers to the characteristic properties of Fire : and it is thought highly probable that the Electric matter is in effect nothing more than the solar heat absorbed by the Earth, and by thus undergoing some transmutations essentially differing from its
appear-

appearance when acting as Light, therefore the affinity between Fire, Light and Electricity are by many identified as one substance.

Lady M. I am happy to hear some rational account of Fire, as though I daily experience the comforts arising from this element, I am ignorant of their philosophical cause.

Ment. The elementary fluid of Fire is universally dispersed in almost every part of the Creation, and it is generally asserted that Fire or Heat is the only permanent elastic substance in Nature: Air is its natural food, which produces ignition or the kindling quality; for, by uniting with combustible matter such as coals, wood, &c. &c. in infinite variety, the Air is destroyed and the fire that constituted its elasticity is consequently emitted; this effect is demonstrated by combustibles not burning when excluded from Air.

Lady M. I shall now have a clear idea of what causes the Fire to burn which blazes in Winter to infuse warmth into us at that dreary season.

Ment. It is a common but vulgar error to imagine that flame is the quality possessed of a greater degree of heat than the other parts of Fire: its properties have been defined by Sir
Isaac

Isaac Newton to be a burning smoke which has not the same degree of intense heat as the combustible body from which it proceeds, only by ascending and diffusing itself, consequently communicates Fire to a greater extent than its original source; this is the cause of the devastation produced by conflagrations, which often rage with such violence as not to be easily extinguished by the strongest efforts of human skill.

Lady L. I have heard of the tremendous consequences of Fire, which I dread when I am in London or any populous situation.

Ment. Fire like the other elements, is beneficial in its operation, yet in its extreme effects proves destructive; in like manner Water may produce inundations, Air hurricanes and tempests, and the Earth a general convulsion of Nature. With gratitude we must reflect that the good we enjoy greatly preponderates in the scale of human allotments when weighed in the balance against the evil which is placed in the opposite medium; in proof of this self evident principle I will endeavour to enumerate the benefits derived from Fire in the general oeconomy of the Universe. As inhabitants of this terrestrial Globe we are peculiarly indebted to Providence

for

For the dispensation of Fire; if it were not for the cheering influence of this element nearly half our time would be obscured by the gloomy effects of darkness and the painful sensations of intense cold; our food could not be duly prepared, and consequently not masticated in a degree suited to our powers of digestion. Minerals and metals would be of no essential use, as without Fire they could not go through the various chymical processes which render them eventually of diffusive utility in arts, manufactures and commerce; it is therefore to the general beneficial effects of Fire that we may ascribe most of the blessings we daily enjoy; even gold would not answer the important purpose of procuring the commodities necessary for our existence till purified by Fire; as, by its consequent fusion it is converted into coin and becomes the principal agent of wealth by administering all those qualities on which human accommodation seems to depend. Thus much for the universal influence of Fire which enlivens the general system, and operates to produce comfort to individuals of every rank and class: the Fire that burns in the cottage of a Peasant diffuses warmth with as much ardor as that which blazes in the palace

lace of a Monarch: the taper that illuminates the Mechanic sheds as bright a flame as that which cheers the most renowned Potentate, there being no gradation in the diffusion of this blessing in its genuine quality, all stand in need of its aid to render subsistence replete with enjoyments and permanent; therefore it is wisely ordained its influence should be universal.

Lady M. In Winter I shall now more forcibly be sensible of the advantages of Light and Heat: I will be ingenuous enough to confess I never reflected by what means they were obtained, neither did I gratefully acknowledge the benefits I derived from them.

Ment. If it were possible to transport you to Lapland or Kamtschatka, you would then experience a degree of cold that would excite comparative sensations of regret when you reflected on the more temperate regions you had left; this like other instances requires the experience of contrary effects to render a person duly sensible of imparted blessings. As your wants are liberally supplied, abundance precludes an experimental perception of penury, and in all other cases your prosperity prevents your being exposed to those exigences which bring conviction
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to the test ; I shall therefore conclude with expressing my ardent wishes that you may ever possess a due proportion of every elementary blessing, for which I most earnestly exhort you to inwardly feel, and exteriorly demonstrate uniform gratitude, and every other ebullition of moral virtue.

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DIALOGUE

DIALOGUE XI.

FRIDAY.

On the Phænomena Halo, Parhelion, and Rainbow.

Mentoria.

I Shall request you will bestow great attention on the curious Phænomena I am going to describe, denominated Halo or Crown, Parhelion or Parhelium, or Mock Sun. These wonderful appearances are caused by the reflection and refraction of Light. The Halo or Crown is frequently visible, consequently excites no sensations of surprise or astonishment ; but the Parhelion from its rare appearance is regarded by the

the common people as a presage of some extraordinary event. The Corona or Halo is a luminous circle surrounding the Sun, Moon, the Planets, and fixed Stars. These circles are sometimes white, and at other times coloured like the Rainbow: it often happens that only one is visible, and at other periods several concentric Coronas make their appearance at the same time. Those which have been observed about Sirius and Jupiter never exceeded three, four, or five degrees in diameter; those which surround the Moon are also sometimes of similar dimensions, but they, as well as those which surround the Sun, differ in magnitude: their diameters also differ very essentially during the time of observation, and the breadth of the coloured and white circles vary very much, viz. from two, three, four, to seven degrees. The colours of these Coronas are also more softened or less vivid than those of the Rainbow, and are arranged in a different manner according to their size. Those which were observed by Sir Isaac Newton in 1692 were classed in the following order, beginning from the interior part: in the first or innermost part were Blue, White and Red; in the middle were Purple, Blue, Green, Yellow and pale Red; in the outermost pale

Blue and pale Red: these Coronas are very frequent in Holland. M. Muschenbroeck asserts fifty may be seen in the day time almost every year; but it is very difficult to discern them, except the eye is so situated that not only the body of the Sun but also the neighbouring part of the Heavens can be seen. In North America they are so common that there are usually one or two surrounds the Sun every week, and the same number about the Moon every Month. Halos round the Sun are also very common in Russia; it is asserted that in the year 1758 twenty-six were perceptible from the month of April to September. Descartes has observed it never rains when this Phenomenon appears, from which he concludes it is occasioned by the refraction of the light in the round particles of ice which are then floating in the atmosphere; and though these particles are flat when they fall to the ground, he imagines they must be protuberant in the middle before their descent, and in proportion to that projection he supposes that the diameter of the Halo would vary.

Lady L. I never heard of these things before, and am much surpris'd at their existence in the works of Nature.

Ment. You are perhaps a stranger to the philosophic

philosophic terms that describe these Phænomena; though I make no doubt you have frequently seen the Halos which surround the Moon, and have heard people express their expectations of change of weather from a burr appearing round that Planet, which was identically one of the Halos or Coronas I have been describing.

Lady L. Whenever these appear, I shall observe them with great attention, and will inform all my young friends of these extraordinary circumstances.

Ment. Perhaps you may extend your information beyond the limits of youth, as I am fearful too many at a more mature period of life are ignorant of these wonderful instances of curious Phænomena, that you must recollect are only visible in frosty, misty or hazy weather, which causes them to be regarded as the harbingers of rain. There is an artificial mode of representing these Halos or Coronas by placing the flame of a candle in the midst of a steam in cold weather, or else at the distance of some feet on the other side of the window, which will cause the flame to be encompassed by a coloured Halo; this effect may also be perceived when the window in the room is encrusted with a thin body of ice, through the medium of which

the Moon will appear with a large Halo of several varied tints.

Lady L. I shall be impatient for the kind of weather that you describe as necessary to make this experiment, when I shall with much pleasure bring all your observations on this subject to the proof.

Ment. The next subject to be considered is the Parhelion, Parhelium, or Mock Sun, which appearance is extremely curious. This Meteor is exhibited in the form of a very bright light appearing on one side of the Sun, it is apparently of the same size of the luminary it represents, though not always equally bright nor even of the same shape, and when a number appear at one time, they vary in magnitude, and lustre. In their exterior parts they are tinged with colours like the Rainbow, and many of them have a long fiery tail opposite to the Sun, but of a paler or fainter hue towards the extremity. Parhelia are usually accompanied with Coronas, some of which are white and others tinged with the colours found in the Rainbow: they differ essentially in number and dimensions, but uniformly agree in breadth, which is the same as the apparent diameter of the Sun. A very large circle parallel to the horizon

zizon passes through all the Parhelia, which if it were entire would go through the centre of the Sun: frequently there are arcs of lesser circles concentric to this touching those coloured circles which surround the Sun, these are tinged with colours and contain other Parhelia: the order of the colours in these circles resemble those of the Rainbow, but in the interior part with respect to the Sun they are Red, which effect is also observable in many other Coronas. Sometimes the Sun has risen or set with a luminous tail projecting from him of the same breadth with his diameter, and perpendicular to the Horizon.

Lady M. I am amazed at these circumstances; I should be much surpris'd if I were to see this Mock Sun.

Ment. This effect is probably produced from the infinitude of small particles of ice floating in the air, which multiply the image of the Sun either by refracting or breaking his rays, and thus causing him to appear where he is not, or by reflection representing his form, as objects are seen in a looking-glass.

Lady M. I wonder who first observed these Phænomena.

Ment. Appearances of this kind have been mentioned both by ancient and modern Philosophers; Aristotle observes they are only discernible when the Sun is very near the Horizon, though he specifies two that were seen in Bosphorus from morning till evening. Pliny also has recorded the period when this Phænomena appeared in Rome. In more modern times the Parhelia were visible in Rome A. D. 1629, at which time four were distinctly observed; some were also observed 1683. In England and Scotland two have frequently been seen at a time. Parhelia have been discernible for one, two, three and four hours, and in North America where they are frequently visible they are often seen from Sun-rise to Sun-set, when they disappear: it sometimes rains, or there are falls of snow of an oblong form, which is occasioned from the Air in North America abounding with frozen particles in the form of spiculæ, that are perceptible to the naked eye, and are probably the cause of Coronas and Parhelia. Sometimes it happens that the Parhelia appear in a different manner; as when three Suns have been perceived in the same vertical circle, well defined and touching one another; the true Sun was in the middle, the lowest touched

touch'd the Horizon, and they set one after another; a fourth Parhelion has also appeared directly under the real Sun, but this effect is very uncommon.

Lady M. I am fearful you have clos'd your account of the Parhelia, which I regret as it is a subject entirely new to me.

Ment. Novelty, which consists in the consideration of subjects unexplored by common observers, is peculiarly attached to the season of youth: every year, nay, every month, week or day developes some branch of knowledge, and by thus extending your information quickens the desire for fresh attainments. Though I have finish'd my account of the Parhelion or Mock Sun, I must add some remarks on an extraordinary Phænomena that have been observed called *Parasclenæ* or Mock Moons: these wonderful meteors are accompanied by tails and coloured circles like those which are perceived in the Parhelia: an account of several and a particular description of a fine appearance of this kind may be found in the observations of Muschenbroeck.

Lady L. I shall in time cease to wonder; as every fresh instance of information that I receive increases in surprising causes and effects.

Ment. Astonishment, or what we usually call wonder, is the natural effect of ignorance; the well informed rarely meet with objects and but very few occurrences or circumstances to excite surprise. The works of Nature are so diffusive, and many of their operations so profound and occult, it is scarcely possible for an individual to attain a complete knowledge of every particular quality or perfection, yet a moderate degree of application will furnish a mind replete with acute perceptions and due reflection with a competent share of learning on most philosophic subjects; if we avoid perplexing our ideas with intricate theories and abstruse points of science, which often tend to obscure the truth and obstruct the paths of valuable information.

Lady L. I am convinced, my dear Mentoria, you will shield us from this error, as the information you impart cannot fail to enlarge our ideas.

Ment. It is my principal aim to accomplish this desirable purpose, I therefore endeavour to express myself in terms that are upon a level with your conceptions: It is reported that the Ostrich can digest iron, but as I fear your intellectual powers are not of an equal strong texture,

ture, I render your mental sustenance adequate to your concoctive faculties. Technical terms, scientific expressions, and philosophical processes are extremely useful and indispensibly necessary for the propagation of knowledge; yet their general adoption and familiar use would render a female, particularly one of tender years, subject to the reproachful epithet of pedantic, or rank her as a smatterer in learning. From these observations it will appear evident, that I wish your knowledge to be genuine; but your expressions simple, that is, unmixed with an ostentatious display of learning, and uncorrupted by an exuberance of ornament, and an apparent desire to acquire an oppressive degree of superiority.

Lady M. There is little danger of my erring in that point; as when I am in company I have not courage to give my opinion, and I perceive the same sensations in Lady Louisa.

Ment. Courage, or that quality which in the general intercourse with society is in some degree necessary, may with more propriety be termed proper confidence. Too great a portion of timidity, or what we usually call bashfulness, obscures merit, as it prevents the due exercise

of those powers and accomplishments which are an honor to human nature. To this false quality we may ascribe the errors of most young persons in common behaviour, and also the imperfect performance of whatever they undertake to execute in company: as the means of overcoming this evil, from the earliest age, children should be accustomed to sing, dance, and perform all other parts of their education, even though their attainments in those respective branches are incomplete, by which means they acquire an easy unembarrassed manner, that adds great grace and dignity to their general deportment. I have been thus particular on this subject, as I earnestly hope that you will observe the due medium between a bold forward address, and an insignificant sneaking behaviour, as they both will destroy every sensation of respect or consequence.

Lady M. What will be the next subject on which you will be kind enough to expatiate?

Ment. The Rainbow or Iris, which is one of the most beautiful objects that nature exhibits.

Lady L. I always admire the Rainbow, as the colours, though they are brilliantly gay, are

so skillfully blended, there appears not the least degree of glare.

Ment. This is evidently the triumph of nature over art, the greatest effort of human taste or fancy could not compact such a variety of tints without producing an effect that would weary the eye and offend a correct taste. An assemblage of varied hues such as the Rainbow presents, if arranged by an artist possessed of superior excellence in his profession, would be considered as a composition incongruous in its arrangement; yet by the plastic power of Nature, all the component parts so well accord they form a regular harmonic effect, the lights and shades are so gradually contrasted, that brilliancy and splendour are produced, and the mind struck with the impression of perfect beauty. Having thus considered the general effects of the Rainbow or Iris, I shall proceed to explain its natural cause.

Lady L. I wish to be informed by what means the Rainbow is produced?

Ment. When a cloud converted into Rain, is exposed to the rays of the Sun, and the eye of the person who views it is between the Sun and the Cloud, the Rainbow is clearly perceptible.

Lady

Lady M. I can clearly distinguish every kind of colour, red, orange, yellow, green, blue, indigo, and violet.

Ment. These beautiful tints are occasioned by the refraction of the rays of light that pass through the Rain, which fills the atmosphere at that period. The uppermost drops reflect the red rays, the next in degree is the orange, and so on in regular gradation, the violet being the last that appears.

Lady L. Are there any particular periods when the Rainbow is discernible?

Ment. The Sun cannot possibly be more than 42 degrees above the horizon when a Rainbow appears; because when it is higher than that point, its axis passes beyond the eye of the spectator. The different dimensions of the Rainbow entirely depend upon the height of the Sun at that period; when the Sun is in the Meridian, the Rainbow appears the least to us, and as he gets gradually lower and lower, the Rainbow increases in height; and when the Sun is in the horizon, the Rainbow attains its greatest dimension, and appears nearly of a semicircular form. The Rainbow always is visible in that part of the heavens apparently opposite to the Sun, from which it appears evident
that

that it is occasioned by the Solar rays falling on the drops of Rain.

Lady L. I recollect frequently perceiving a fainter kind of Rainbow in the sky; by what means is that phænomenon produced?

Ment. This fainter coloured Bow that appears above the Rainbow, is commonly termed a Water Gall, and as the colours are reversed in position and effect, it is undoubtedly a species of reflection from the Rainbow, and as a considerable portion of light is lost in each reflection, the colours in the higher Bow, as a natural consequence, become more diluted or softened than those in the lower, from which they are derived.

Lady M. I am more obliged than I can express, by your explicit description of the Rainbow.

Ment. You must keep in mind that the Rainbow never appears but when it rains, or nearly at that period, and you may simplify its philosophical effects by an easy experiment, as a bubble at the end of a pipe will refract the Sun's light in the same manner as the drops of Rain which form an Iris or Rainbow, in both cases the gradation of colours is uniform. An artificial fountain also will exhibit, in form and colour,

colour, the exact properties of this extraordinary phænomenon; and from the peculiar construction of our visual organs, the dimensions though so near, will appear as far off, and as large in size, as the real Rainbow.

Lady L. I scarcely know any object in Nature more beautiful than the colours of the Rainbow.

Ment. Its form is equally worthy of admiration, as there is something inexpressibly graceful and majestic in the semicircular figure in which this phænomenon generally appears, in the vaulted concave of the Celestial Hemisphere.

Lady M. Is not the Rainbow particularly mentioned in the Bible?

Ment. For a full explanation of this subject, it may be necessary to revert to the account I gave you of the Noahchical dispensation of the Covenant of Grace which God entered into with mankind, immediately after the Flood. The Supreme Being, when he had enjoined certain conditions of obedience, assured Noah of prosperity and his blessing; and in token that the Earth should not again be destroyed by a Deluge, thus declared, " I do set my Bow in the Cloud, and it shall be a Covenant between

me and the Earth, and it shall come to pass, when I bring a cloud over the Earth, that the bow shall be seen in the cloud, and I will remember my covenant, which is between me, and you, and every living creature of all flesh, and the waters shall no more become a flood to destroy all flesh, and the bow shall be in the cloud, and I will look upon it, that I may remember the everlasting covenant between God and every living creature of all flesh that is upon the Earth. And God said unto Noah, this is the token of the covenant which I have established between me and all flesh that is upon the Earth." Thus graciously did God indemnify the inhabitants of the Earth from experiencing his wrath, by the same means as before had expressed his displeasure: therefore we ought to regard this instance of Divine condescension with the most reverential gratitude.

Lady L. I always thought the Rainbow a very pleasing spectacle, but had no idea of its serious import.

Ment. You will perceive in a variety of other instances, your perceptions have been able only in a very limited degree to appreciate the importance of objects to the extent of their intrinsic worth, or latent tendency. The contem-
plation

plation of the works of Nature leads in an especial manner to enlarge the conceptions, when we reflect that God is ever present, our actions should be guided by the strictest rules of circumspection; and when we seriously consider his infinite attributes are not confined by space, nor his existence or duration circumscribed by time, our imaginations naturally soar to the boundless ages of eternity. The Firmament, and the various luminaries that adorn it, which are probably distinct worlds, all co-operate to impress the mind with the most sublime and awful sentiments; and in this research our intellectual powers are absorbed in wonder; and when exerted to their greatest stretch, cannot fully comprehend the heights of omnipotent perfection!

DIALOGUE

DIALOGUE XII.

SATURDAY.

On the Terraqueous Globe, various
kinds of Earth, Fossils, and
precious Stones.

Mentoria.

IN the course of my Lectures on Astronomy and Natural Philosophy, I have hitherto only described the Earth as a Planet annually revolving round the Sun, as a part of the Solar system; I shall therefore now endeavour to enumerate its properties and perfections, as the Terraqueous Globe, which is assigned to us as a temporary abode, in our present probationary state.

Lady

Lady Louisa. I think that will be a subject replete with many interesting and important particulars.

Ment. We must first consider the Earth as a large mass or body, of a Spheroid form, rather flattened at the Poles, and more protuberant at its equatorial parts, the surface of which is divided from one Pole to the other by two bands of Earth, and two of Water, of immense magnitude and dimensions. As navigators have not been able to penetrate to regions at the Poles, from the ice in those seas, the proportion of Earth and Water cannot be precisely ascertained: only from what is discovered, it is generally believed there is more sea than land. As it is my intent that my present instructions should be rather Philosophical than Geographical, I shall not specify the different kingdoms and countries on the Earth, but confine myself to a definition of its constituent parts, and shall affix a Copper-Plate of the Globe, which will enable you to judge of its construction respecting its Terrestrial and Aquatic properties.

Lady Mary. I shall be very attentive to your observations, from which I have no doubt Lady Louisa and myself will reap solid advantage.

Ment.

Ment. I shall first consider the Universal power, energy, or spirit that is to be regarded as the Divine agent or efficient principle by which the whole mass of matter in the Earth is actuated, agitated, or put into constant motion; this evidently exists, and is demonstrated, by every object in Nature; as if there were no motion, there could be no heat, of which there is a considerable portion in the Earth, unquestionably proved by the wonderful Phænomena of Hot Springs, Volcanoes, &c.

Lady L. I am amazed at these instances of Divine skill, exemplified even in the Earth, on which I never bestowed a thought.

Ment. The next point to be explained is the Universal Vegetation in the Earth, by which term you are to understand such natural bodies as grow and increase from parts organically formed; but that have no sensation or life. This effect is not confined alone to plants and trees, but is extended to spars, fossils, minerals, and metals, as Silver discovers as perfect an expansion in branches and leaves as Fern; and Gold grows in grains of different dimensions: thus it is demonstrated that metals increase in their proper Earth, or Ores, in a regular process of Vegetation.

Lady

Lady L. I could never have imagined that Gold was capable of growth, or increase of bulk.

Ment. The last branch of these wonderful effects is the Universal Plastic Power in Nature, by which is meant that Principle which from the Creation arranged the various forms of Matter into that beautiful systematic order, which is uniformly manifest in the general oeconomy of the Earth. To this permanent effect may be ascribed the invariable similarity and characteristic marks that are preserved in every genus and species of animals, plants, and the general productions of nature, which never depart from the leading traits of their genuine character: thus for instance, Earth, Sand, Gravel, Clay, Loam, &c. are unchangeably of the same form or quality. Stones, Flints, Pebbles, Slate, Marble, Marcasites, and Metals, have the same specific properties in every region. Spars, Crystals, and precious Stones are always the same kind of Body: thus the works of Nature are uniform in their operations, and never deviate from the prescribed line of organic distinctions.

Lady M. I shall in future think the Earth a subject of importance, and shall neglect no
 oppor-

opportunity of observing its extraordinary qualities.

Ment. The solid parts of the Earth are formed of beds or strata of different materials, which lie one upon another in regular order. The first stratum consists of Mold, or common soil, intermixed with a great variety of decayed vegetable and animal matter blended with sandy and stony particles. In different regions the other strata are found to consist of incongruous materials, variously disposed, such as Sand, Gravel, Loam, Clays, Argile, Marl, &c. In some situations the strata are horizontal, in others they are inclined, and veins or fissures of Metals, Coals, and other minerals, frequently penetrate through the different beds or strata to a great depth and divide them: every stratum, either horizontal or inclined, has an equal thickness throughout its whole extent. In this mass of solid matter, the superficial, or that nearest to the surface of the Earth, is the least pure in quality; all substances derived from the sea in form of sediment or sand, and those composed of the combinations of the animal and vegetable productions, and that have been changed by volcanic fires or sublimed by the internal heat of the Globe, are transformed

in

in quality, and become vitrifiable, or can be turned into Glass, by the sole action of fire, as all fixed matter, when decomposed in the greatest degree, is reducible ultimately into Glass. You will therefore perceive that the different strata or beds of which the Earth are composed, consist of distinct layers of Sand, Stone, Clay, Shells, Marble, Gravel, Loam, Marl, Chalk, &c. &c. and these beds are invariably parallel to each other, and of the same extent. Chalk affords a striking instance, where Nature deviates from the usual resemblance, between a production and its parent stock, as Flint that is the hardest in texture and blacker in hue than any stony substance, is produced from Chalk, which is of the softest and whitest quality: it is not unuseful here to add the importance of Flint in striking fire with steel; Chalk also is of extensive use, as it can be converted into Lime, Whiting, &c. and is the most remarkable absorbent in nature. Chalky hills afford the best Springs of soft water, and soften those which are of a hard quality: and to conclude my eulogium on Chalk, I shall remark, it is in a variety of cases efficacious as a medicine, and an excellent manure for Land: these useful properties

perties render it so valuable, it may be justly ranked as a celebrated Fossil.

Lady L. I fear you have finished the account of Earth as an element, which I much regret, as I find it very curious and entertaining.

Ment. There are some other species of Earth I will enumerate, as they are of essential utility to us in the general accommodation of life. The first is Fullers Earth, which possesses an extraordinary purifying quality, and is of great use in cleansing cloth from spots of grease; and also is of important service in manufacturing cloths. The next is the Earth from what are called the Soapy Rocks in Cornwall, near the Lizard Point. This substance has the appearance of soap, and produces the same effect to the eye and touch; but is not possessed of its cleansing quality, yet is of great use in manufactories of China, on account of the white, fine, and firm grain of its texture.

Lady M. The extraordinary properties of this Earth, like every other part of the creation, excite my wonder and admiration.

Ment. I will next endeavour to describe a remarkable Fossil called Muscovy Glass, which is the most superior species of Talk that the

Earth produces. The internal parts consist of plates or flakes of a thin transparent substance, very much resembling thin sheets of glass, and transparent in proportion to their thickness; and are often so thin as to float in the air, and by reflection, produce the most brilliant colours in nature: this Fossil is not of a brittle quality, but pliant, elastic, and strong; which render it of great utility in optics, as it is not easily affected by fire or flame. Amber is another Fossil, the qualities of which I will briefly specify, it is supposed to be of a mineral nature, consisting of a kind of bitumen, that was once in a fluid state, hardened by a mineral acid, which is evinced, from the number of extraneous objects observed in it, such as straws, small insects, &c. its native colour is yellow, its substance is transparent, and of a hard compact consistency, admits of a high polish, and is of an inflammable nature. This was the first substance observed to possess an attractive property, which I have already mentioned in my observations on electricity. The next substance the ancients discovered to be of an electric quality, is now called *Tourmalin*, and as the Dutch jewellers found it attracted ashes, they named it *Ashes Tracker*; as electricity is of two kinds, amber possesses one quality, and glass the other,

but Tourmalin is endued with both, or rather each sort may be excited in it, the positive degree of electricity being on one side, and the negative on the other, which are put in action alone, by the influence of heat. This Fossil may be properly said to be a jewel or gem, endued with wonderful properties; yet from its small bulk, is not converted to practical uses, but is regarded only as a curious object.

Lady L. I never thought Fossils were so extraordinary in their nature as you describe.

Ment. The most renowned and delicate Fossil the Earth affords, is called Island Crystal, which is celebrated by naturalists and philosophers, for its singular property of a double refraction of light; like other Crystals it is of a pure pellucid quality, and as clear as water, and like them grows from the hardest rock and stone, in form of hexagonal pyramids, with very sharp points. This Crystal is converted to the form of prisms, and by that means produces not only a double reflection of one object, but a multiplicity, which occasion a variety of prismatic colours that are of great use in the science of optics. As I have already described the Magnet or Loadstone, I will not repeat my remarks on that subject.

Lady M. These observations on Fossils are so new to me, I cannot express the pleasure they afford me; but pray my dear Mentoria, what does the word Fossil imply?

Ment. The term Fossil is derived from the latin, and means any substance which is, or may be digged out of the Earth; but is more particularly applied to some peculiar species, that are discovered in the interior part of its substance. One of the most extraordinary of this numerous tribe, is the *Asbestos* or *Amiantus*, which possesses the wonderful quality of resisting the force of fire. In form and substance it appears like a common Fossil stone on one side; but on the other, exactly resembles a piece of fine green silk or satin; silky filaments run through the whole length, owing to the firmness of its texture, and the natural polish of its fibres, which when raised up with the point of a needle, appear of a soft silky substance, and as white as cotton. The ancients possessed the art of manufacturing this into fine webs of silk for garments, and the moderns are not ignorant of the means, though its rare quality prevents its common use.

Lady M. How valuable such garments must have been.

Ment.

Ment. This wonderful Fossil is of so rare a quality, a sufficiency of the curious specimen I have described to you cannot be procured; also from its brittle nature it must be interwoven with flax, and when formed into a fine thread, be put into the fire to destroy the flax, and by that means leave a pure Amianthus, Asbestos, or incombustible cloth; this kind of Fossil, which is found in England, is of an inferior quality and no great value; as those of superior excellence, like every other kind of Fossil, are produced in the greatest perfection in hot countries.

Lady L. It is wonderful such extraordinary substances are found in the Earth.

Ment. The ground on which we tread conceals a subterraneous museum of invaluable treasures and curiosities; the deeper we penetrate, the more profound our ideas must be of that Being who created all these extraordinary productions. The next species of Fossils I shall describe is called Mundic, which is a kind of Marcasite, esteemed for its glowing colours that are innate and permanent, and when in an opaque solar microscope, appear not only greatly magnified, but exhibit an inexpressible degree of resplendent beauty.

Lady M. It would give me great pleasure to see the objects you have described, and I hope my dear Mentoria you will be kind enough to contrive some means of affording me this satisfaction.

Ment. I will use my best endeavours to that effect; and shall now proceed to give you some idea of that class of Fossils which are held in the highest estimation, as Jewels, Gems, and Precious Stones. The Cryстал is the most common kind, it is devoid of colour, transparent, and of a very hard texture, growing from rocks in a pyramidical form, and sometimes in the shape of a pebble, as the Brazil kind. Agate is ranked in this class, though very common, it is for the most part opaque and variegated with colours in a beautiful irregular manner. Jasper is found in form of a flint or pebble, and when wrought appears a beautiful green, sometimes spotted with white clouds, and is rarely transparent except when it is very thin. The Emerald is green and in forms of pebbles and Cryстал, and when polished is of a beautiful lustre. The Cornelian Sardius or Sarda, found in pebble form, when polished is of a whitish flesh colour, or blood-red hue, and frequently variegated and veined with pale red and white. Onyx is a precious stone, semi-transparent, formed in zones about a central body,

body, which constitute its beauty. The Sardonyx is nearly of the same quality, resembling the Sardius in its flesh colour, and the Onyx in its annular marks and tabulated form. The Topaz is invariably found in an oblong pebble form; by the ancients it was denominated Chrysolite from its golden colour, in which it excels, but varies from a very deep to a pale tinge. Sapphire is a beautiful gem, distinguished by its azure or sky coloured blue appearance. They are sometimes found in columnar crystalline forms, and frequently in the shape of pebbles, and vary in the tinges of their colour, from the palest to the deepest degree. The Ruby is greatly esteemed for its glowing red colour and hard texture. The Carbuncle is only a species of Ruby, but is so denominated as when held up to the Sun it resembles a glowing charcoal. The Beryl is a finer sort of Crystal, generally of a columnar form, but also found in pebbles, it is of a fine bluish green colour, which it never loses. The Jacinth or Hyacinth is a Gem of the pellucid sort, of a red colour with a mixture of yellow; it is of a columnar form, sometimes found in Pebbles and is subject to a great variety of tinges from the Ruby to Amber. The Amethyst is a stone of

■ beautiful colour, being a mixture of red and blue, which produces every degree and gradation of ■ purple hue; it is found in form of Pebbles and Crystal. The Garnet is a Gem of a deep red colour with ■ cast of blue, variable in its tinges down to a flesh colour, it is always found in the Pebble form, and does not lose its colour in fire like other Gems.

Lady M. I shall view the brilliant Gems that you have enumerated with additional pleasure; now you have informed me of their respective properties.

Ment. There yet remains the most resplendent species of Gem or precious stone for me to describe, which is the Adamant or diamond: this Jewel excels every substance in nature by its peculiar hard quality and the power of refracting light; it is cut and polished by its own substance reduced to fine powder, and its superior brilliancy is produced by its wonderful refracting quality, which greatly exceeds that in Crystal or Glass. It is found in various forms of Crystal and Crystalline pebbles with several irregular sides which often have a native polish; its dimensions are various, the great Mogul has one that weighs two ounces and a quarter, worth seven hundred, seventy nine thousand,

two hundred and forty four pounds. The heat of common fire does not affect this Gem; it is the produce of the East Indies, and other parts of the Torrid Zone, where all the species of the most valuable precious stones are also found.

Lady L. Diamonds are so beautiful in their effect, one cannot see them without admiration, accompanied by a wish to obtain such brilliant ornaments.

Ment. They may morally be considered as a lesson, as well as an external decoration; their latent brilliancy resembles intrinsic merit and superior abilities, and their resplendent lustre in a polished state, forcibly inculcates the advantages derived from the joint efforts of skill and judicious refinement.

Lady L. Be assured, my dear Mentoria, I will be more zealous to resemble the Diamond in its valuable resplendent qualities, than to possess it literally as an exterior distinction respecting rank or dress.

Ment. There are some other Fossils, not distinguished by brilliancy, which are of great utility in Medicine, Arts, and various occupations. The Lapis Lazuli, of which the finest blue colour, called Ultramarine, is made. The Turquoise Stone, sometimes reckoned amongst

Gems, ^{as} Bismuth and Zink, much used in soldering Gold and Silver. Antimony, celebrated for its medicinal qualities. Native Cinnabar, which is a kind of Mercurial Ore, from which Mercury is obtained. Sulphur, the most inflammable substance in nature, and of very essential use in Medicine, and for the common purposes of life. Bitumen, of a pitchy sulphureous property. Asphaltos is also of a bituminous quality. Naptha, a liquid Bitumen, very inflammable and difficult to extinguish. Petroleum, a sulphureous oil distilling from the clefts of rocks, and Arsenic, a mineral of a most destructive poisonous quality.

Lady M. I have heard of fatal accidents, by persons taking Arsenic, by accident or design.

Ment. The misapplication of a variety of things proves detrimental, though in many respects they may be useful when skilfully employed. As I have finished my account of Minerals, I shall proceed to inform you the Earth also yields many saline productions, distinguished in the following species of Salts, such as Alum, Sal Ammoniac, Nitre, Borax, Sal Gem, &c. Vitriols of various kinds, blue, green, red, white, &c.

Lady

Lady L. I have frequently heard these things mentioned, but had not the least idea they were taken out of the Earth.

Montmo. The interior part of the Globe is an inexhaustible magazine of invaluable treasures: the superficial observer, who does not penetrate beneath its surface, has no knowledge of the riches unexplored by his narrow conceptions; whilst the Philosopher and curious Speculator discern perfection in every atom of the varied compound Terrestrial mass. The Deity may be traced in the most minute object, and his attributes shine with equal resplendence in the common Flint as in the Diamond's blaze! It is a circumstance which should excite our gratitude and praise, that the several varieties of Stone, Coal, and many other articles which are of extensive use, are abundantly diffused, whilst Gems and precious Stones are comparatively rarely found. A diversity of soil is also a remarkable instance of Divine mercy and goodness, as it greatly tends to produce abundance and diffusive blessings. In some districts the Earth is of a light sandy quality, in others of a clayey, chalky, stony, or flinty property, and in many parts gravelly, or of a mixed substance, which conduces to our general accommodation,

and promotes universal vegetation. Some regions abound with quarries of Slate, Limestone, Freestone, and Marble, others with mines or pits of Coal, and a variety of subterranean substances too numerous to be specified, yet too important to pass unregarded by the most unlearned of the human race.

DIALOGUE

DIALOGUE XIII.

M O N D A Y.

On the Terraqueous Globe, Ores,
Metals, Vegetation, and ter-
restrial Beings.

Mentoria.

AS I have no doubt your curiosity is excited by my account of the various kinds of Earth and Fossils, I shall continue our subterranean research and proceed to inform you of the nature of Ores and Metals.

Lady L. I have frequently heard of Metals, and know in some degree what they are, but pray my dear Mentoria what do you mean by Ores?

Ment.

Ment. Ore is a hard Mineral Stone, either Rock or Pebble, which is more or less impregnated with particles of Metal, these when separated from the earthy part, are melted into a solid mass or body of pure Metal: I will endeavour to give you a concise idea of this process. The Miners have stamping mills, which by repeatedly breaking the lumps of mineral ore, at last reduce them to a kind of dust or powder, which is carried by a stream of Water from the mill, over several platforms of Wood, lying one below the other, upon a gradual descent, and consequently upon each platform the powdered mineral adheres, in proportion to the size and weight of its particles, the lowest being as fine as is necessary. Thus pulverized, it is conveyed to what is called the Smelting-house, where it is put into a large furnace, with a proper flux to promote its fusion, and there by the influence of the Fire it is melted, and sinks to the bottom in a fluid state, and the Earthy part all rises to the top by being of a lighter quality. The melted metal is drained off into suitable vessels, where it gradually consolidates by cold into massy substances of metal, such as Blocks, Ingots, &c. &c. I have previously observed the various effects of vegetation in silver ore, which

which appears like branches and leaves in a multiplicity of beautiful forms. Copper Ore is also remarkable for the variety of brilliant tints it exhibits, and it is generally supposed, produces the different hues in the several species of Marcasites or Mundics, Crystals, Precious Stones, &c.

Lady L. These circumstances appear very extraordinary, I cannot forbear expressing my admiration of their beneficial effects; how many kind of Metals are there?

Ment. From those properly called Metallie Ores, only seven, Gold, Silver, Copper, Iron, Tin, Lead, and Mercury, which all agree in the common character or nature of Metal, viz. a hard shining mineral body, fusible by various degrees of heat, principally Fire, subject to its particles being concreted by cold, malleable or ductile under the hammer, or any other weight, and specifically the heaviest of all Bodies.

Lady L. Is not Gold the most valuable Metal?

Ment. It is not only the most valuable, but the purest of all compound bodies; it is proved to be the heaviest by being 19 and a half times more weighty than water; and is more ductile or malleable than any other metal. It is fusible
(that

(that is, can be melted in the Fire), but is more fixed, and loses less in the Fire than any other metallic substance. It is of a yellow colour by reflected Light, and of an azure colour by refracted Light, through the thin leaves thereof; has an obtuse sound, and is only dissolvable in Aqua Regia and Mercury. Gold is sometimes though but rarely found in Ore, often in its native state, but most commonly in small Grains or Dust in the sand of many Rivers on the Gold Coast of Guinea, and many other places.

Lady L. Which is the next Metal that you are to describe, my dear Mentoria?

Ment. Next to Gold, Silver is the most pure, fixed, and ductile Metal. It is of a perfect white colour, and respecting its growth and form, bears a greater degree of similitude to vegetable substances than any other metallic body: it can be dissolved into a pellucid fluid, by Aqua Fortis, and possesses no colour. The next Metal in regular order is Copper, which is peculiarly distinguished by its sound, or sonorous quality. It is of a red, or deep purple colour, but gives a fine blue to a solution of it. It is chiefly found in a very hard stone of a dark colour, running in veins between beds or layers of rocky Earth or Stone; and sometimes in its
pure

pure native form of a perfect malleable quality. It appears to have a vegetative power of shooting into twigs and branches, and very frequently exudes in the mine, in form of blue pointed shining Crystals, in large heads of six or eight inches wide, which have a beautiful appearance.

Lady M. Pray, Mentoria, what are the qualities of Iron?

Ment. Iron is the hardest of all metals, it is fusible by only the greatest degree of heat, but malleable and ductile with a common red hot heat, and may be hammered till it becomes red hot, and is the only body in Nature susceptible of the Magnetic power. It dissolves in Aqua Fortis very easily, and more rapidly than any other metal, but is corroded by the acid in the air, and becomes rusty. When red hot under the hammer, it emits scales or flakes of calcined iron, highly magnetical. Iron is never found pure, but always in Ore, either Pebble or a hard Stone, it may be extracted by the Loadstone from the Ashes of Plants, and in Crystallizing, discovers less of a vegetable form than any other Metal; it is of a whitish glittering colour when broken.

Lady

Lady L. I recollect Tin is the next Metal, according to the rank or order you mentioned them in.

Ment. Tin is the lightest of all Metals, in colour it is as white as Silver, but softer than any other Metal except Lead. It melts with a small degree of heat, is malleable, not very subject to rust, and possesses no sonorous quality. It has the least fixity in fire of any Metal, easily blends with other kinds, all of which it renders brittle except Iron. It is found in Ore of hard stone, and also in opaque Pebbles.

Lady L. I am greatly indebted to you for informing me of the properties of such useful and valuable productions of Nature by which I benefited, but was not sensible of their extraordinary qualities.

Ment. Lead is the next metal I am to describe; it is the heaviest of all metallic substances, except Gold and Mercury. It is the softest of all Metals, consequently melts the soonest, and is very ductile and flexible, and less sonorous than any other kind, and the least fixed by Fire. It is seldom found pure, but in an Ore of a glossy black hue.

Lady

Lady L. I fear you are now come to the last branch of the Metallic Ores, which is Mercury.

Ment. The properties of Mercury, or Quick-silver, will require particular explanation ; though a Metal, it is a Fluid Body, therefore you must understand that Fluidity is one state of Metal produced by a certain degree of heat, and fixity or solidity is another, by a degree of cold that our air invariably affords, which is found insufficient to fix Mercury, or convert it into a solid body, even in the frigid regions at the Arctic circle ; though at Petersburg an artificial degree of cold has been made to fix it into a body as hard as Lead, and whiter than Tin when cut, and to render it ductile and malleable, by which is meant a state capable of being beat by a hammer.

Lady M. In your description of Metals I am surpris'd that you have made no mention of Brass, Steel, or Pewter.

Ment. They are not natural, but factitious metals that are made by art. Brass is a compound produced by mixing pulverized Calamine stone with Copper, which by letting it stand a proper time in a wind furnace, is converted into Brass. Steel is not a distinct Metal from

from Iron, but only so purified and altered by art, as to be of a finer grain and of a harder quality, consequently better suited for making sharp instruments and implements to cut with. Pewter is a compound of several metals and minerals so compounded, as Tin mixed with Lead and Brass, Bismuth, &c. Tin Plates are in reality Iron plates covered with Tin on both sides, and are penetrated so strongly by the Tin, they appear to be such by the whiteness when cut; but still the Iron retains its magnetic quality. There is also a new mineral, called Platina, which is even heavier than Gold, and in colour resembles that Metal, but is very hard and brittle; when blended with Gold or Silver it produces a rich compound, superior in quality to Bell Metal, Pinchbeck, or Princes Metal, of which a variety of articles are made. I have been very explicit and diffuse in my remarks on metallic substances, as most species of metals are of essential utility. In the first instance, Gold and Silver, by being converted into current coin, produce the various accommodations of life; and from the value, by the general consent of all civilized nations intrinsically allowed to them, in a great degree constitute wealth. It is scarcely possible to enumerate the advantages

tages we derive from Copper, Iron, Tin, and Lead, if it were not for the several properties of those metals, we could have no buildings or ships constructed, no useful implements or utensils made for agriculture or domestic purposes, and, in fine, our situation must be reduced to nearly a savage state, respecting the varied comforts and conveniences of social intercourse. From Mercury we receive many benefits we are not in every instance able to trace, as it is used in a variety of means, and produces many good effects philosophically and medicinally, which would be beyond your comprehension and my present purpose to explain.^a I have dwelt more on these subterranean treasures, as I am convinced very few comparatively have a clear notion of their importance and wonderful qualities, though in other respects what are usually termed well-informed and cultivated by a liberal education; thus many who are deeply skilled in scientific learning are totally ignorant of the productions of Nature, and the general system of the Universe.

Lady L. I am surprized that the generality of persons should be so inattentive to subjects of such importance.

Ment.

Ment. This almost universal consequence arises from the prevailing erroneous habit of confining instruction to particular branches of knowledge, usually called scholastic or classical, which render persons learned respecting words, and ignorant concerning the general structure and properties of things. As I have endeavoured to explain the interior productions of the Earth, I shall now proceed to consider those instances of Divine power exemplified in the varied vegetable substances that grow on its surface. Vegetative Nature differs very essentially from animal existence, as it consists alone in growth, which is commonly called its life. Every Plant properly defined consists of various determinate parts, which have this vegetative power by Nature, of unfolding themselves from a certain fixed point or basis downward into the Earth, and upward into the Air: the descending part is gradually unravelled, protruded, extended, and carried forwards in numberless branches and ramifications through the circumjacent parts of the resisting Earth, Stones, Rocks, &c. to the most filamentary state; and this assemblage of parts is called the Root. The ascending part consists of much greater variety, and in fact constitutes the whole substance of the

Plant

Plant in miniature. The vegetative power in the Earth causes the several parts in the Plantula (or embryo of the plant contained in the seed) to evolve and unfold themselves by imperceptible degrees, till at length they are separated one from the other, and appear above ground in the proper and specific forms in what are called Leaves, Blades, Stalks, Stems, Branches, Flowers, Seeds, &c. which compose the adult, complete Plant.

Lady M. I have frequently sown seeds in the garden, and observed with much pleasure their gradual process of growth.

Ment. Every Seed contains in itself the whole Plant's similitude on a small scale which produced it: this Plantule, or Plantula, is placed in the side of each Seed, consisting of two parts called Lobes; it is included between and connected with both on the side where they join. The œconomy of the circulation of fluids through the body of the Plant, is as incomprehensible as that in the body of animals in general, though its obvious mechanical principle is produced by the natural power of attraction between the particles of matter in bodies. If we attentively examine each particular part of a Plant, they appear to be created for some important

portant purpose or use, the Root for its stability and nourishment from the Earth, the Fibres to contain and convey the Sap, besides which there are a large sort of vessels to contain the proper and specific juice of the Plant, and others to carry air for the degree of respiration necessary to its existence. The outer and inner Bark of Trees serve to defend the Trunk and Boughs from the excesses of heat, cold, and drought, and to convey the Sap or vegetative nourishment for the annual augmentation of the Tree, every species of which may in some degree be said to be an annual Plant, as the Leaf, Flower and Fruit proceeding from the coat that was superinduced over the wood the last year, which never bears any more, but with the old wood serves as a block to sustain the succeeding annual coat or covering. The Leaves serve before the Gemma or Bud is explicated, to defend the Flower and Fruit, which are even then perfectly formed, and afterward to preserve the Branches, Flowers, and Fruit from the intense effects of the Solar heat, and also to prevent the too rapid evaporation of the moisture about the Root. It is worthy of observation, that notwithstanding Plants by culture and manure may be highly improved in quality and dimensions, yet the same

same Plastic Power which operates in every other part of the Creation prevents their exceeding in growth beyond the limits of their original specific form.

Lady L. A Garden affords such a variety of pleasures, it is scarcely possible to suppose any person wholly insensible to their impressive effects.

Ment. Horticulture, or that kind of study which is confined to the cultivation of Gardens, is a pursuit fraught with innumerable sources of delight and improvement; yet Vegetation is so diffusive in its extent, and in every branch even in its wildest state abounds with specimens to excite our wonder and admiration: I shall therefore briefly consider its general effects. In the first instance, the greatest part of the dry land is covered with a kind of carpet of green grass and other herbs, not only most pleasing, but the most salutary to the visual organs, and this is also decked with great variety of Flowers of beautiful colours and forms, possessed of sanative and fragrant odours, conducive to our gratification, and the refreshment of our animal spirits. The Earth is likewise furnished with beautiful Shrubs and stately Trees, affording us not only pleasant and nourishing Fruits, many

Gums, Liquors, as Turpentine, Tar, &c. Drugs, and valuable Medicines; but also Timber and utensils for all kinds of trade and varied occupations conducive to the general convenience of the human race, and the support of subordinate animals. It is graciously ordained by Providence, that vegetables which are designed for animal sustenance are abundantly produced and increased, and many propagated not only by the Seed, but also by the Root producing off-sets, some by creeping under ground, and others above the surface of the Earth. It is a striking proof of Divine mercy, that those kinds of grain which are defined under the general term of Corn, (by which you are to comprehend all that are of a quality to make Bread) such as Wheat, Rye, Barley, and Oats, are very generally diffused; and that Wheat, which is the purest and most salutary kind, flourishes not only in temperate, but in regions of an extreme hot and cold climate, and is also of a remarkable fruitful nature; which even Pliny, who was a Heathen, produced as an argument in favour of the bounty of God dispensed to Man. When we reflect what myriads of beings are supported by herbs, grain, and general vegetation, we are naturally led to acknowledge the wonderful provision

vision that is made for every species and gradation of animal life. The Earth yields an ample store of every requisite to sustain the general œconomy of the Mundane system, every particle of which is subject to the same general laws and properties, as those clearly defined and specified in the regular order of the Universe, Terrestrial as well as Celestial. On a general survey of these blessings, it would be a heinous species of neglect to withhold that tribute of grateful acknowledgment for the benefits which, as inhabitants of the Terraqueous Globe, we enjoy from the combined effects of the varied perfections I have so imperfectly delineated. The Earth is the basis and support of all animals and Plants, and affords them the hard and solid parts of their bodies, yielding us not only food and sustenance, but also raiment. The beings usually called Terrestrial animals, from being inhabitants of the Earth as their congenial Element, are Man, Quadrupeds, Insects, and Reptiles; these are all respectively so judiciously arranged, that the most perfect harmony subsists. Beasts of Prey are confined to deserts and their native dens, by the restraining hand of Providence; whilst those which are docile and domestic, are more generally diffused, and by

their varied properties conduce either to our sustenance or convenience, some being fit for food, others for the support of burthens and laborious purposes, and many for our essential benefit or amusement. The noble qualities of the Horse, the fidelity of the Dog, the utility of Oxen, Cows, and Sheep, are subjects which must afford rational grounds for admiration. The degree of instinct approaching to rationality, exemplified in the Elephant and Beaver, and the eminent portion of sagacity found in a great variety of other animals, cannot fail to impress a contemplative mind with a just sense of Divine Wisdom, more especially when we reflect that these beings, though superior in strength, are subordinate to the human race, to whom they are under subjection by the decrees of all gracious Providence. I will next consider the nature of Insects, which are so called, as their bodies appear as it were infected or divided into different parts, their eyes are all fixed in their heads, and not moveable as in other animals; every species of winged Insects have but two eyes, but all the different kinds of spiders have some four, many six, and others eight. The Insect Tribe is so numerous, I shall not attempt to enumerate them, but shall only remark

mark they vary very essentially, the same animal being at one time an Insect, the next a mere Reptile, and afterwards neither Insect nor Reptile, and are also Aquatic as well as Terrestrial. The various changes of the Butterfly and Silk-worm are well known; and many remarkable instances might be produced of several transmutations in form and quality, that would be beyond my present purpose to describe. The mechanism of the smallest Insect is a subject of most exquisite symmetry, and frequently of resplendent beauty; and their operations, in their several allotments and stations, extremely curious. The Spider, the Bee, the Silk-worm, and the Ant, afford lessons of ingenuity, industry, and prudent œconomy, worthy of praise, and in many respects of imitation. Spiders are not in reality proper Insects, as they have no feelers, no wings, more eyes, and more legs, and their heads are joined to their bodies; some Insects have two transparent membranous Wings, with small hairs or bristles on the surface, and others have four wings, two large and two small.

Lady M. Pray my dear Mentoria, what is a Reptile?

Ment. Any thing that creeps or crawls along with many small feet, which causes them generally to be called Multipedes, many of this tribe have been denominated Centipedes, as if they had a hundred feet, and many Millepedes, as if they had a thousand; which is not to be understood literally, but as implying, that the animal has a great number of feet; such as Wood-Lice, Caterpillars, most Worms, and all the Lizard kind; for notwithstanding they have but four feet, they move by creeping and crawling along. Snails also have no distinct legs, yet belong to the Reptile class, as their motions consist in gliding on the surface of any substance.

Lady L. Are not Reptiles usually considered as an inferior order of beings?

Ment. They possess many extraordinary qualities, though perhaps not such distinguishing marks of excellence as many other parts of the creation. I will next engage your attention on the Feathered Race, which are the most gay, melodious, and elegant species of animals that exist. If we consider the beauty of their plumage, the exquisite harmony of some of their notes, the wonderful instinct they display in forming their nests, and rearing their young;

we must allow they are possessed of many eminent qualities, ■ they delight the eye by their exterior perfections, charm the ear by the most perfect melody, and regale the appetite by the delicious quality of the flesh in many species; and by their great variety, and brilliant colours, enliven the general appearance of nature. Birds that have a carnivorous appetite, are called Birds of Prey, such as the Eagle, Vulture, Kite, Hawk, &c. The feathered tribe are also divided into two kinds, Land and Water Fowl, which clearly distinguishes their proper element. When the formation and plumage of Birds are attentively considered, they appear to be possessed of extraordinary beauty and agility; it is also remarkable, that some can swim, whilst those of lighter bodies, fly to great heights, and many migrate at stated seasons, and return in regular order to their native regions. In these annual excursive flights, these delicate beings must be subject to great exertions and difficulties, and proceed with a degree of regularity which would not disgrace an army of veteran troops.

Lady M. I admire Birds, and take great pleasure in keeping and feeding them.

Ment. Every pursuit that tends to increase your reverence for the Author of Nature, is

laudable, and to a mind unperverted from a just sense of the Divine attributes, every, the most minute object excites grateful sensations. On a moral retrospect of the Terraqueous Globe, we shall find it abounds with varied substantial provision for its numerous inhabitants. The beasts of the field are furnished with pasturage, herbaceous, and farinacious food, Insects and Reptiles are amply supplied with sustenance by the various productions of vegetation. Birds are supported by seeds, fruits; and an infinitude of resources the fields and gardens afford; and as it is the property of most animals to prey on those of an inferior quality, they eat insects and reptiles, whilst many animals of superior strength and magnitude prey on them; this universal property produces a general kind of carnage, as the human race are nourished and supported by the inferior beings, which by the express appointment of their Maker, are created for their use, and submitted to their care and protection.

DIALOGUE

DIALOGUE XIV.

TUESDAY.

On Mountains, Rivers, the Sea,
Submarine Productions, Fishes,
Amphibious Animals, and Zoo-
phytes.

Mentoria.

IN our progressive investigation of the wonderful qualities of the component parts of the Terraqueous Globe, the next that demands our attention is Mountains.

Lady Louisa. I know that Rocks and Mountains are of a great size and stupendous height; but pray *Mentoria* be very explicit respecting their several uses and construction.

Ment. A Mountain, or high hill is a part of the Earth rising to a considerable height above the level of its surface; and a rock is a large mass of stone, rooted in the ground. The origin of Mountains, many suppose, was the natural effect of the Deluge, whilst others maintain they have been produced by explosions, by the means of subterranean fires, and that they have probably great concavities beneath them; since it has been proved that subterranean fires have raged in caverns under the sea. By many, Mountains are rashly considered as excrescences or imperfections, yet in reality they are productive of great benefit to the human race, and many species of animals, by affording shelter from the intense cold of the Northern and Eastern winds, and serve also for the production of a variety of vegetables and minerals, to which no other soil is congenial. These terrestrial protuberances greatly add to the beauty of the scene, by the contrasted variety they produce of hills and vallies; as it is certain if the Earth were an even flat surface, the sea would cover the whole Globe, and hence become only the habitation of fishes and aquatic animals.

Lady Mary. That would be a dreadful situation, I will never in future presume to wish
any

any part of the universe different from what is produced by the unerring effects of Divine wisdom.

Ment. This determination will prove an effectual barrier against hasty conjectures, and consequent erroneous opinions; as we may depend that there is not an atom in the whole Volume of Nature, incongruous to the organic construction of the complete system. In proof of this assertion, it is evident the continuity of ridges and chains of lofty mountains, generally being found to run from East to West, consequently prevent the progress of the vapours towards the Poles, without which they would all run from hot countries and leave them destitute of Rain. Mr. Ray remarks, as an argument of the importance of Mountains, that they condense these vapours like Alembic heads (by which you are to understand a vessel used for the purpose of distilling liquids) and so by a kind of external distillation, give origin to Springs and Rivers, and by that means, and by amassing, cooling, and compacting them into Rain, render the torrid regions habitable. Mountainous situations are also the only temperature in which animals of several descriptions can exist.

Lady L. I am now fully convinced of the advantages derived from Mountains, and will never be weak enough to wish the Earth were a perfect level surface.

Ment. To the benefits I have already specified, I must add their importance by the production of Metals and Minerals ; as the mountainous parts of the Earth, though apparently only very large and high Rocks, frequently covered on the outside with verdure and herbage, are interiorly composed of Mines which contain all those productions, to which we annex the idea of intrinsic value. Mountains, by the diversity of the soil, are remarkable for producing the greatest variety of vegetables, and peculiarly those appropriated to medicinal purposes ; they also prove in some degree boundaries and defences to the territories and kingdoms in continental countries.

Lady M. When you are describing Mountains, you sometimes mention Rocks ; in what degree, my dear Mentoria, are they connected ?

Ment. All the Earthy substances of which some Mountains are composed, and with which they might once have been covered, have for ages been washed away from their summit, and nothing is left remaining but immense Rocks,
that

that no tempest has been able to destroy, which cause the tops of Mountains to be bare and pointed, and occasion those masses of Rocky substances that frequently fall from tremendous precipices. When Hills and Rocks are found formed of a heterogeneous mass of Marine productions in inland situations, such as shells and stalks of Sea-weed, and in other respects of a similar quality with those which stand within low water mark, it is reasonable to suppose they are so many wrecks and monuments of the general devastation the Deluge produced; as a mass incorporated with petrified Sea bodies cannot otherwise be probably accounted for at so remote a distance from their genuine native source.

Lady L. Are there not a great number of Rocks in and near the Sea?

Ment. Undoubtedly, and which frequently produce the most fatal effects to mariners by the calamity usually called shipwreck, occasioned by the vessels dashing against the Rocks. These substances are formed of the common sediment of the Sea, as sand, bones of Fishes, stalks of Sea Weed, empty Shells, and a variety of extraneous marine productions, that are rolled into beds by the constant agitation of the Waters, and thus being blended together, by the violence

of

of the flux and reflux of the Sea, are banked up towards the shore, which is the cause of the inclination or dipping of Rocks. No sooner is this stratum laid, than there is a continual accession of the same matter, till the mass has reached a certain height in Water. These loose materials, as soon as vegetation commences, are adhered by a strong cement, and assume the consistency of Stone, and frequently appear like white Marble, capable of a high polish: this definition I hope will give you a clear idea of Rocky substances.

Lady M. I now have a clear notion of Rocks and Mountains, but pray Mentoria describe what Volcanoes are, and by what means produced?

Ment. Burning Mountains, usually called Volcanoes, contain in their interior parts sulphur and bitumen, with other combustible matter, which serve as food to a subterranean fire. The orifice from which the eruptions proceed, are often of great extent, from whence issue flame, streams, or rivers of bitumen, sulphur, melted metal, and clouds of calcined stones, cinders, and enormous masses of Rocks, which are tremendous in their operations, cause Earthquakes, destroy cities, overthrow Mountains,
and

and agitate the Sea. In Europe there are three remarkable Volcanoes, Mount Etna, Mount Vesuvius, and Mount Hecla. In Asia and America there are a great number of burning Mountains that sometimes emit fire and smoke, and also in Africa there are several phenomena of this kind. In continental countries, the Mountains usually form chains, and in Islands are generally more distinct and raised above the Sea in pyramidical or conical forms, and are denominated Peaks; all these prominences are masses of Rocks heaped one upon the other, from some of their summits occasionally emitting burning matter similar to Volcanoes. Precipices that are between Rocks, are caused by the sinking of Rocks, from the effect of air and frost which separates them, and by the joint effort of torrents, they are divided into a variety of cleft forms.

Lady L. I believe the next subject you are to illustrate will be Rivers; I expect they will prove a pleasing contrast to the burning Mountains.

Ment. In defining the properties of Rivers, we shall find they are only Waters descending by their gravity to lower parts of the surface of the Earth, in proper channels, and are entirely

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occasioned by great quantities of Water collected on the tops and sides of Mountains and high lands, from the accumulated vapours of Rain, Snow, Fogs, Dews, and also Clouds, which run through various chinks and apertures into their internal cavities and reservoirs, till they are completely filled. The superfluous Water afterward flows through various channels and recesses to the sides of Mountains, where they form in concavities Pools, Ponds, or Lakes, and also operate as bubbling Springs, many of which are of a perennial, others of an intermitting, and some of a reciprocating quality.

Lady M. I have heard you frequently mention the Head and Mouth of Rivers, what do these terms signify?

Ment. The Head of the River is the source from which it first springs, and the Mouth implies where it empties or discharges itself into some Sea: thus the Nile rises in the Abyssinian Mountains and falls into the Egyptian Sea, a situation immortalized in Fame, by Lord Nelson's brilliant victory.

Lady L. I recollect your shewing me the seven Mouths of the Nile, in the maps of your sacred history. Pray, Mentoria, what are the principal benefits that we derive from Rivers?

Ment.

Ment. They are so diffusive, I cannot possibly reduce them to any specific form or number. In the first instance, their flux and reflux occasioned by the influence of Tides, which I have already explained, are produced by the attractive powers of the Sun and Moon on the Ocean, and prevent that stagnation which would inevitably render the water of a putrid quality, consequently of a destructive tendency. In the next place, Rivers supply water for the general accommodation of life, are indispensibly necessary for Navigation, driving of Mills, working of Engines, and a variety of other important purposes, beyond my ability to specify. Rivers possess many extraordinary qualities; the principal Rivers fall into the Sea; but there are some that lose themselves in the sand, and others that appear to penetrate into the Earth; it is also observable, that in inland situations at a distance from the Sea, they flow in a direct line, but as they are near their Mouths they acquire more of a winding or serpentine course in their progression.

Lady L. Pray, Mentoria, what are Lakes?

Ment. A Lake is a standing pool, or great collection of waters, which differ in quality; some have no connection with any River, and
from

from which no water goes out ; others do receive Rivers, and from which also others run ; and there are some which only receive Rivers. I shall not specify the different Lakes, as I fully explained that branch in my Lecture on Geography.

Lady M. As you have finished your account of Rivers, I suppose the next subject of your instructions will be the Sea.

Ment. Sea is a general term adopted to express the immense body of salt water opposed to that of Rivers, which is of a different quality ; though those vast briny expanses that encompass the Globe, with stricter propriety are denominated the Ocean, the word Sea being with more justice applied to denote a particular part or division of the general mass, often so called from the countries it washes, or from other circumstances, as the Irish Sea, Mediterranean Sea, &c. &c.

Lady L. The Sea is an object that I contemplate with great delight ; therefore I wish to be informed of its dimensions, and most important uses.

Ment. The extent of the superficies of the Sea, compared to that of the Land, is not precisely ascertained, though it is generally supposed

posed to exceed two thirds. As the Waters of the Earth must necessarily rise to the surface thereof, as being specifically of a lighter quality; it was expedient there should be large cavities, as receptacles to contain them, or they would have overspread the superficies of the Globe, and rendered it uninhabitable for terrestrial animals.

Lady M. What would have been the immediate cause of that dreadful effect?

Ment. The centre of the Earth is supposed to be of a magnetic quality, by being the common centre of Gravity, to which all objects on the Terraqueous Globe invariably are attracted; and as it is the nature of Fluids, that they equally yield to equal powers, and the power of attraction being every where equal, at equal distances from the centre, it follows as a natural consequence that the superficial parts of the Water will every where conform themselves to an equi-distant situation from the centre, and by that means constitute the surface of a sphere, as far as they extend.

Lady M. This rationally accounts for what before appeared to me inexplicable; but pray, my dear Mentoria, what is the depth of the Sea?

Ment.

Ment. The depth or profundity of the Ocean in some places is asserted to be unfathomable, and in others variable, some few parts are above a mile deep, but the most common depths are from 60 to 150 fathom; and the profundities are much less in Gulphs and Bays than in Oceans; and in general the depth of the Sea bears a great analogy to the height of mountains on land.

Lady L. I am surprized so many Rivers falling into the Sea, do not cause it to overflow.

Ment. The chief cause why the Sea does not encrease by the means of a vast accession of waters from Rivers, is principally occasioned by the Waters returning from the Sea by subterranean cavities, and aqueducts, through various parts of the Earth; and also from the quantity of vapours raised from the Sea and falling on the land which by that means cause only a circulation, but no increase of Water.

Lady L. It is surprizing that the Sea, which frequently appears so tempestuous, does not at those periods inundate the land.

Ment. It can only be ascribed to the omniscient decrees of an over-ruling Providence; that the Sea should compose itself to a level, or
equal

equal superficies, and with the Earth be comprised into a spherical form, and that it should also be defined by strands, shores, and certain limits: as however the Sea may appear to rage, its Divine Creator thus proclaims, "thus far shalt thou go, but no further"! Notwithstanding the Sea does not exceed its bounds in a degree to prove destructive, in some instances several encroachments have been made, of no importance when considered as relatively connected with the general œconomy of the universe. It is a matter of dispute whether those encroachments made by the Sea on the land, or whether the Land or the Water are gaining on each other, in this terraqueous Globe. In Great Britain several encroachments have been remarked; in the time of Augustus, the Isle of Wight was a part of the Island of Britain, so that at that period the Britons crossed over towards it with carts loaded with Tin. In general on the Eastern side, the Sea has gained ground, whilst on the Southern and Western it has increased in some places, and lost in others.

Lady L. What produces the beautiful Waves and different appearances of the Sea?

Ment. The natural effects of the Flux and Reflux of the Sea, by the mutual attraction of
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the Sun and Moon, but principally of the latter, which I have fully described in my explanation of the doctrine of Tides, as produced by the universal power of the Laws of Gravity and Attraction. The Waves, Billows, and Surges which cause such a varied sublime effect, are occasioned by the agitation of so vast a body of Water, by the efforts of the Winds and the joint influence of the Tides: and their diversity of tints and hues is derived from the Solar rays emitting light in peculiar directions. The saltness of Sea Water is on very rational grounds ascribed to Mines and Mountains of Salt dispersed in the depths of the Sea; this saline property is of diffusive utility, as it preserves the great expanse of Water from the effects of putrefaction, by keeping it pure and uncorrupted; it also renders the Water more dense or heavy, and consequently better suited to sustain ships of large burthen, and promotes the purposes of navigation by being less liable to freeze, and thereby prove inaccessible, and also to nourish a variety of beings whose native Element is the Sea, and lastly, to fertilize lands by the salutary effects of its saline vapours, and the qualities that are extracted from its extraneous matter, as manure.

Lady

Lady M. You have given me so clear an account of the Sea, that next Summer, when I go to Weymouth, I shall view it with peculiar pleasure and attention.

Ment. There yet remains many wonderful properties for me to describe, in particular, respecting submarine vegetative productions, which include Plants, Shrubs, and Trees, that grow under the Sea, or on its immediate coasts.

Lady L. I have frequently seen Sea Weeds of varied descriptions, and have had many in my possession.

Ment. The Submarine vegetables are divided into three classes, Plants, Arborefcient Shrubs, or Corallines, and Coral Trees; as the hard substance of which these productions consist is called Coral. The texture and form of these varied objects are so well known, I shall not attempt to describe or enumerate them; they differ very essentially in their origin from the nature of terrestrial Plants, which are germinated from a seed, and derive their nourishment from the Earth by means of their root and fibres, whilst Sea Plants are fixed by a broad basis to the hard surfaces of Stones and Rocks, and appear to receive their nutriment and growth through the general component parts
of

of their bodies, and have no Seeds or Flowers. As these plants are considerably lighter than Sea Water, they are consequently supported by it; and when by accident they are torn from the substance to which they adhere, they swim, and are washed on shore by the surges of the Sea, and by being cast on the Coast, afford improvement to the curious, benefit to those employed in agriculture, and also in glass manufactories, by burning the Sea Weeds for the salt their ashes contain.

Lady M. I never before knew that Coral is a Sea production.

Ment. The specimens you have seen, differ very essentially from the Corallines I have just mentioned. The Coral you admire is a vegetable Spar or Crystal, that the Earth produces, which is nourished by Sea Water; it chiefly grows upon Rocks in various species, forms, sizes, and colours; the most perfect sort of Coral is the red and white, as the black Coral is in fact only a submarine wood. Besides this genuine kind of Coral, there is a spurious species, called Madreporé, of which there are some in Canada of a lively blue hue. The form and growth of Sea Plants are a striking proof of Divine skill, and that the motion of the
Water

Water extends to a considerable depth ; as those Plants which grow at the bottom of the Sea, and at a great distance from its surface, generally are of a flat form, in some degree resembling the construction of a fan, but not with lateral branches like Trees, which construction is peculiarly adapted to enable them to encounter the flux and reflux of the tide, without sustaining any injury as to their figure or duration. In the most profound abysses of the depths of the Ocean, Mr. Ray thinks it highly probable there are neither Plants nor Fishes, as their remote situation from the external surface would render the portion of air, and the supply of insects as food, inadequate to the purposes of existence ; and from the influence of their aquatic element, Submarine Plants are of a dusky olive colour, but never of a vivid green hue, like terrestrial vegetables ; though many are of the most delicate texture, and possessed of inherent beautiful colours : and to the variety I have already enumerated, the Sponges which are common in use, constitute a distinct order of Submarine Vegetables.

Lady L. Do we not derive several advantages by being inhabitants of an Island ?

P

Ment.

Ment. We are benefited very essentially by our insular situation ; in the first instance, by the extent of Trade and Commerce, and also by the consequent influx and connection with the most distant regions, which accumulate wealth, and tend to the general civilization of the inhabitants of such a distinguished Isle, blest by local advantages, and protected by lenient laws administered with impartial justice. Notwithstanding you are well informed respecting the principal Islands in the different parts of the Globe, I must add some remarks respecting the New Islands that are sometimes produced by the sudden operation of subterranean Fires, or by the more gradual process of sediments of Water, these are but rare ; but there are many New Islands occasioned by the Mud, Sand, and Earth, which the Rivers or the Sea convey to different parts of the Globe ; the Sea also by retiring from certain Coasts, and by encroaching on others, and thereby covering the lowest part of the surface, by that means produces the same effects ; and it is observable, there are but very few islands in the middle of the Sea, but chiefly near to continental countries, where they were probably formed, either by the retreat or approach of that irresistible body of Water. I shall

shall now close my account of Islands; I hope you are truly sensible of the individual and general blessings we enjoy, as natives of a land enlightened by Christianity, refined by the progress of Arts and Sciences, and protected by a wise Constitution, which is the basis of Civil and Religious permanent security.

Lady M. It is impossible for me to express my gratitude for the dispensation of the blessings you have enumerated; and I regret the probability of your having completed your account of the Sea.

Ment. Concerning its general properties, I have little more to observe, but as I have endeavoured to explore its most profound recesses and its abundant productions, it is in some degree necessary for me to make some remarks concerning its various Inhabitants. In this research, Fishes are the first class of beings, that present themselves to our view, which may be thus distinguished; first of the cetaceous kind that includes the Whale in all its varieties, the Dolphin, the Grampus, and the Porpoise, which in some degree resemble Quadrupeds in their internal construction and habitudes, and cannot subsist under the water, for any considerable length of time; the next tribe are of the Car-

tilaginous kind, which have cartilages or gristles instead of bones, and are subdivided into the Shark, and Ray kind. The next are the spinous kind of Fishes, or those of the bony kind, which are so numerous, they are sometimes divided into a variety of classes, to denote their several properties, some of which possess a poisonous quality. The last order is Shell Fish, which are thus ranked. First the crustaceous kind, such as the Lobster, Crab, Tortoise and Turtle; next the testaceous species, the shell of which may be considered as its habitation: as these subjects may be traced in infinite variety, as the means of giving you a clear idea of their several general distinctions, I shall inform you that Aristotle divided them in the following manner. The univalve, or turbinated, which consist of one piece like the shell of a snail; secondly the bivalved, consisting of two pieces united by a kind of hinge, as an Oyster; and lastly the multivalve, consisting of more than two pieces, many of which tribe are formed of a number of parts. All these varied species are found in different depths of the Sea, and are valuable in proportion to their beautiful, or rare properties.

Lady

Lady L. A friend of mine gave me a collection of shells which I greatly esteem, I believe he brought them from the East Indies: Pray Mentoria, are not Pearls produced from some kind of Shell Fish?

Ment. The most rare and beautiful species of Shells are brought from Eastern regions; your present will appear doubly valuable if you not only admire it for the varied exterior elegance of its several specimens, but also reflect that the most minute article has been the abode of some animated being. Pearls, as you rightly imagine, are the production of Shell Fish, many of which are found to contain Pearls, but particularly that species which has obtained the name of the Pearl Oyster; it has a large strong shell of a whitish hue, exteriorly of a wrinkled rough texture, and in the inside of a silver colour and smooth quality, from which what we call the Mother of Pearl is produced. The Oysters which contain the superior kind of Pearl, are principally found in the Gulph of Ormus, and several parts in the East Indies; though there are Pearl Fisheries established in various places in the Asian and American seas, and these valuable Oysters are procured by a regular process of diving for them to a considera-

ble depth, which is effected by the efforts of skill, undaunted by imminent danger. Pearls which are esteemed as an elegant costly ornament, next in degree to precious stones, are nothing more than a preternatural excrescence of the Fish, probably not the effect of disease, but only produced by some extraordinary means from the same matter that constitutes the shell.

Lady L. It is extremely kind of you to give us such a particular account of those things which we so often view, but have never seriously regarded.

Ment. I have endeavoured to describe the several kinds of Fishes, which you must strive by some other means to be circumstantially acquainted with. Fish in general may be regarded as inhabitants of the Sea; though some particular species live in fresh Waters, and others migrate annually to Rivers to deposit their spawn, which could not be so safely disposed of in the tempestuous depths of the Ocean. The construction of Fishes is admirably adapted to their peculiar situation; the air-bladder with which they are almost universally endued, enables them to respire in an element apparently uncongenial to that purpose. Their fins, and tail are formed of a texture, to accelerate their progress,

gress, and keep their body in proper equilibrium and due course: and their great fecundity is wisely ordained for the preservation of each species, as they are not only food for Man, but the objects of prey for all superior kinds of Fishes, which make regular depredations on each other, and subsist by that means, and on the insects and plants the Sea produces.

Lady M. Are not Fishes a very wonderful tribe of animated beings?

Ment. Without doubt, and distinguished by several characteristic marks, as well as by great inequalities in their dimensions, some being scaly, others covered with skins of a smooth surface, and many defended by a coat of a hard, yet often of a brittle quality: they are also subject to great variations in size, some being of a large magnitude and others diminutive; and great numbers fit for food, but some particular species of a poisonous nature. Besides Fishes, there is another kind of animals whose proper element is the Sea; such as Seals in their several variations, the Walrus and the Manati: these creatures all form a distinct class in the scale of beings, by being compounded of heterogenous qualities, which render them, notwithstanding they are animals, nearly allied to the Cetaceous tribe

tribe of Fishes; as the Seal and Walrus have a kind of members resembling four feet, consequently approach nearer to quadrupeds than to Cetaceous Fishes; but the Manati by having only two fore feet, resembles the Cetaceous kind more than quadrupeds. The Seals, and Walrus also, from the peculiar construction of their heart, can subsist either on Water or Land: but the Manati species cannot properly be termed amphibious, as they never entirely leave the water, but only advance their head to the shore to eat grafs and herbage: they are sometimes found in Salt Water, but chiefly in Creeks and Rivers near the Sea, but not very far from land.

Lady L. What do you mean by amphibious animals, my dear Mentoria: is the Sea Bear of that quality?

Ment. The Sea Bear, which is often called the White Bear, the Polar Bear, or the Sea Bear, is not of that class, as it only lives occasionally on the fields of ice in the frozen Seas, and at other times on land. The term amphibious is properly applied to such animals as are constructed to breath the air, but pass the greatest part of their time in the Water, as that element affords them the most food, such as the
Frog,

Frog, Otter, Beaver, &c. &c. and likewise to several species of plants as grow either on Land or in the Water, viz. the Alder, Willow, &c. &c.

Lady Mary. I fear you have finished your account of the Sea, its productions and numerous inhabitants; and I anticipate with much concern that your instructions on Natural Philosophy are nearly terminated.

Ment. There yet remains another branch of existence immediately connected with the Sea, called Zoophytes, that are not produced by the usual course, but by dissection; as, if they are divided into several parts, each becomes in due time a perfect animal; such as the Polypus, or Polypes, which according to their varied species have different names. There is also another wonderful genus of Sea animals that appear to be a kind of animated plant, and grow upon the surface of Rocks, Pebbles, Stones, &c. to which they so firmly adhere, it is with difficulty they are separated without essential injury to their texture. They are of various species, forms, sizes, and different colours, one in particular, is called the Sea Anemone, and others resemble young Aloe leaves, and many
when

when expanded, appear like Flowers beautifully variegated.

Lady. L. How can these productions that resemble flowers, be animals?

Ment. It is evident they are possessed of animal powers, from the motions and actions of their bodies; and they are asserted to be very expert in catching and devouring their prey; such as Crabs, &c. &c. To this wonderful class of beings, the Polypus, the Earth Worm, and all the varieties of the Sea Nettles, properly belong, and very probably also, those that produce Coral, and Sponges.

Lady M. The next time that I am on the Sea coast, I will endeavour to get some of those Animated Plants; as I shall take great pleasure in such curious Phenomena.

Ment. I have considered the Earth, first as a Planetary Orb, performing its annual course round the Sun; secondly, as a Terraqueous Sphere composed of Land and Water; and lastly, as a Congregated Globe, inhabited by myriads of beings endued with powers suited to their state of existence. On a philosophical survey of the operations of Nature, it appears evident, that the Deity in a variety of instances, gradually unfolds his divine attributes in the general

neral system of the Universe. In the animal classes, the gradation is progressive from Man to the Ape; from the Ape to Quadrupeds; from Quadrupeds to Cetaceous Animals; and from those tribes to Birds, Fishes, and Reptiles. By extending this research still further, we may clearly trace the degeneration from Reptiles to Insects; from Insects to Worms; from Worms to Zoophytes; and from Zoophytes to Plants. In each variation the declension is marked by a combination of qualities which have a kind of analogy, and form a regular shade that connects every genus into a system of perfect order, and organic harmony.

Lady M. I had no idea there were such similarities and connections as you have specified; but am now clearly convinced, that every part of the Creation abounds with perfections, which are not sufficiently the object of attention.

Ment. The Universe proclaims its Maker's praise, by the various proofs it exhibits of Divine Excellence; blessings which are diffusively dispensed, though but imperfectly estimated or acknowledged. Our gratitude should be peculiarly excited when we reflect, that in the general scale of Being, the Human Race hold the first

first class. This superiority arises wholly from their intellectual faculties; as several inferior species exceed them in strength and magnitude, and by the operations of instinct, equal them in ingenuity, and many other valuable qualities; therefore their pre-eminence alone originates from the possession of Reason, and that immortal pure intelligence of Mind that render them capable to judge between Good and Evil, and to contemplate the works of their Creator. The general subordination that may be delineated in all parts of Animated Nature, as necessary to the existence and welfare of every member of each species, inspires a contemplative mind with acquiescent resignation respecting the several stations and allotments in life, which constitute collateral degrees, conforming to those in the Animal Genera, as relative to distinctive qualities. Those properties which exalt Human Nature to its greatest possible degree of perfection, are universally dispensed; such as Reason, and the various operations of Intellect; whilst partial distinctions, as elevated Rank, Riches and Power, are only occasionally bestowed to fulfil the general purposes of order, requisite for the benefit of the Community; as individually, those possessions
neither

neither ensure happiness nor prove an exemption from the various conflicts and vicissitudes of temporal events. On an impartial retrospect of Human Frailty, and a just statement of Divine Mercies and dispensations, those must be considered as inestimable that deliver Mankind from the dominion and penal consequences of Sin, by the perfect atonement of our blessed Redeemer! Let these sublime truths enlighten your minds, and produce humility in its most comprehensive and refined sense, which in the highest station, is not inconsistent with dignity of character; endeavour by your example and precepts, to stem the current of popular error in all matters that operate against the suggestions and decrees of Moral Principles. By your general conduct evince an uniform devout reverence for the Christian Religion, Holy Ordinances, and Sacred things; but above all, as the ultimate criterion of your duty, cherish an entire, unlimited confidence in the Promises of God, and the efficient Protection of his Divine Providence!

FINIS.

DIRECTIONS TO THE BINDER.

The GLOBE to face the Title.

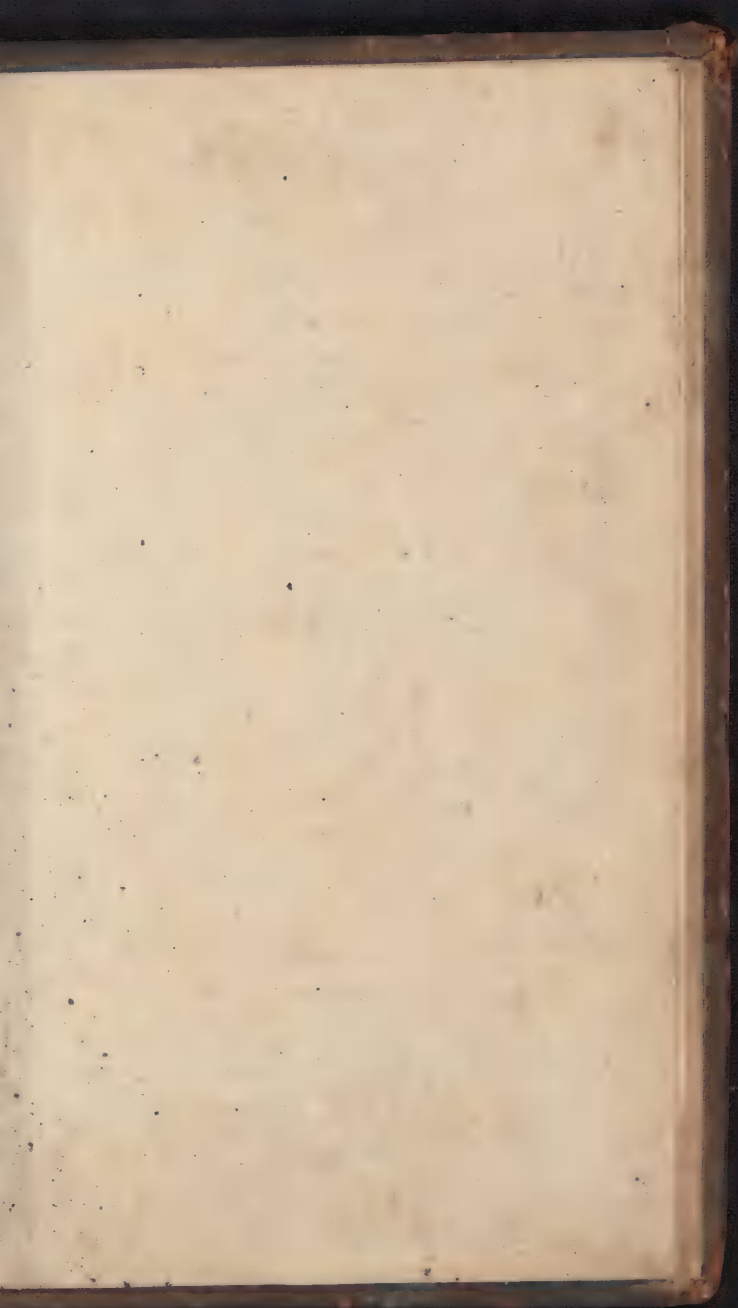
Table of Diameters and Distances of PLANETS, to face Page.....28

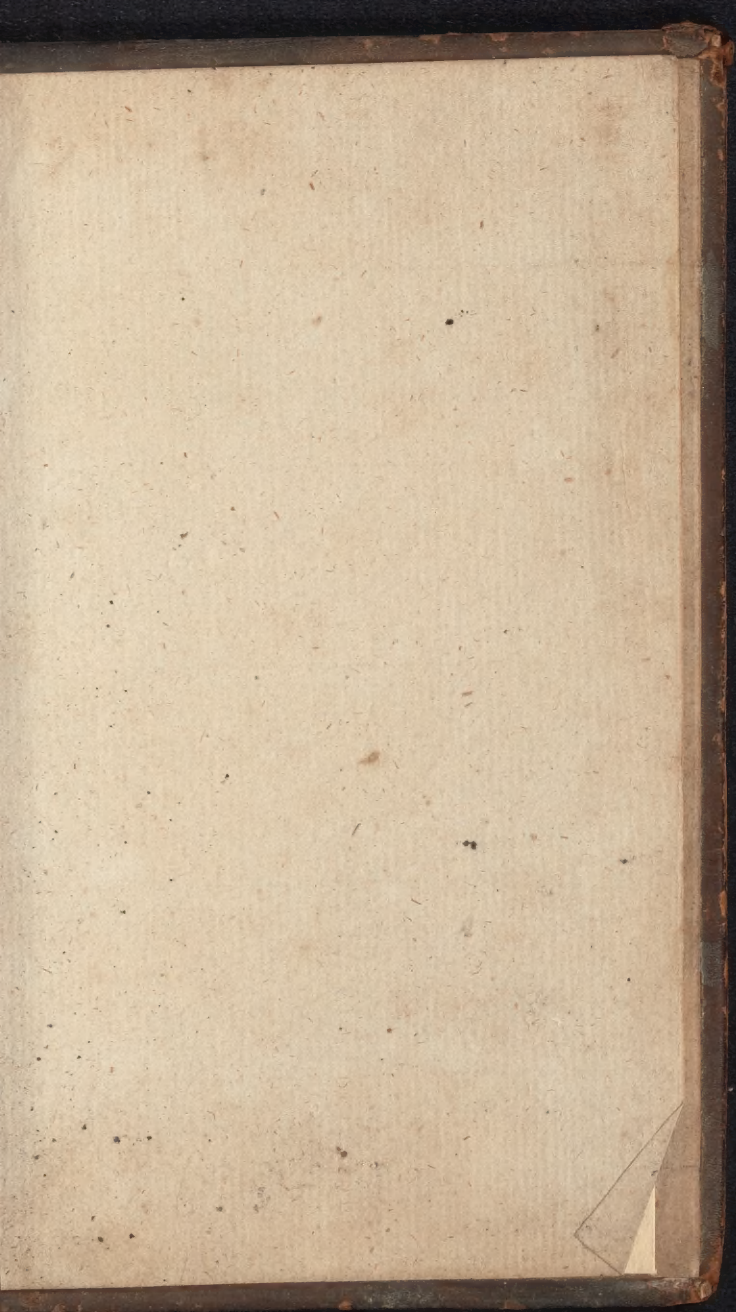
The NORTHERN CELESTIAL HEMISPHERE, and the SOUTHERN CELESTIAL HEMISPHERE, to be placed between pages 54 and 55, on a Guard.

List of CONSTELLATIONS & STARS to face p. 80

ERRATA.

- | | | | | |
|------|------|------|-----|--|
| Page | 6. | Line | 5. | for <i>is</i> , read <i>in</i> . |
| — | 8. | — | 20. | for <i>bid</i> , read <i>bidden</i> . |
| — | 58. | — | 19. | for <i>Pleacades</i> , read <i>Pleiades</i> . |
| — | 66. | — | 27. | for <i>is</i> , read <i>are</i> . |
| — | 70. | — | 17. | for <i>Archemedes</i> , read <i>Archimedes</i> . |
| — | 145. | — | 8. | for <i>is</i> , read <i>are</i> . |
| — | 167. | — | 13. | for <i>requires</i> , read <i>require</i> . |
| — | 244. | — | 9. | for <i>surrounds</i> , read <i>surround</i> . |
| — | 249. | — | 18. | for <i>Parasclena</i> , read <i>Parasclena</i> . |





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